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# THESIS

## NAVAL MEDICAL PAPER-LESS OFFICE: THE WAY OF THE FUTURE?

by

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June 1999

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This thesis studied the paper-less office concept in the naval medical community. A paper-less office is defined as an "environment where the transmission, storage, and retrieval of information is not done through the medium of paper; rather, it is done through electronic data networks (Hicks, 1997)."

The hypotheses were constructed in the following manner: "The greater the resource, leadership, technology, etc. the higher the probability of success in creating a paper-less office." Data was gathered using a web-based survey approach. The survey was sent to all the Naval Medical Treatment Facilities (MTFs) Chief Information Officers (CIOs). Upon receipt of the survey data, SPSS software was used to conduct the statistical analysis.

The objective of this thesis was to investigate what the Naval Medical Treatment Facility CIOs are doing to move towards a paper-less office and what the determinants are in developing a paper-less office. Although the hypotheses were not supported, the data identified both accomplishments (such as intranet creation, installation of fax server, etc.) and current activities undertaken by the MTFs CIOs in the paper-less office environment.

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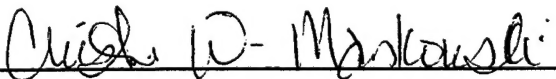B.S., Park College, 1990

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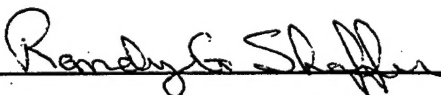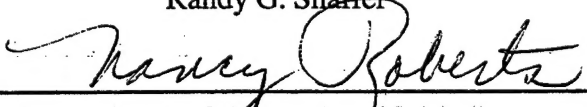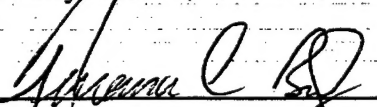## June 1999

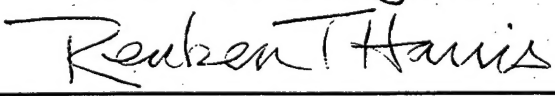Authors: _____
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# ABSTRACT

This thesis studied the paper-less office concept in the naval medical community. A paper-less office is defined as an "environment where the transmission, storage, and retrieval of information is not done through the medium of paper; rather, it is done through electronic data networks (Hicks, 1997)."

The hypotheses were constructed in the following manner: "The greater the resource, leadership, technology, etc. the higher the probability of success in creating a paper-less office." Data was gathered using a web-based survey approach. The survey was sent to all the Naval Medical Treatment Facilities (MTFs) Chief Information Officers (CIOs). Upon receipt of the survey data, SPSS software was used to conduct the statistical analysis.

The objective of this thesis was to investigate what the Naval Medical Treatment Facility CIOs are doing to move towards a paper-less office and what the determinants are in developing a paper-less office. Although the hypotheses were not supported, the data identified both accomplishments (such as intranet creation, installation of fax server, etc.) and current activities undertaken by the MTFs CIOs in the paper-less office environment.

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# ACKNOWLEDGEMENTS

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We would also like to acknowledge our fellow Naval Medical Chief Information Officers for completing the survey and submitting there command informtion. Their quick turn around and feedback was very critical to our completion of this thesis.

# I. INTRODUCTION

## A. BACKGROUND AND HISTORY

A paper-less office can be defined as an "environment where the transmission, storage, and retrieval of information is not done through the medium of paper; rather, it is done through electronic data networks (Hicks, 1997)."

Information has been stored in electronic form since the early days of computing. The idea of creating a "paper-less office" did not emerge until the 1970s when technology led to smaller, more powerful computers. However, the technology was inadequate at the time and the "paper-less office" concept lost credibility. Even today only 5-10 percent of organization information is in computer form (Gotlieb, 1994).

Most naval medical administrative offices are equipped with a PC system with multimedia capability, e-mail and internet capability, and printers. On the outside, the medical administrative office appears to run very smoothly. However, internally, the workers are overwhelmed with reports, references, publications, standard operating procedures, forms, memos, letters, bulletins, and handwritten sticky notes. The naval medical administrative office spends as much time filing, locating documents, and maintaining references as they do working on projects. Another issue the office faces is where to store all this paperwork they are creating and maintaining.

Naval medical treatment facilities (MTFs) chief information officers (CIOs) have explored and implemented small parts of a paper-less office. Naval Hospital Puerto Rico implemented an electronic routing slip in 1995. In 1996, Naval Hospital Naples began to

utilize departmental intranets. There are probably more examples of paper-less office implementations; however, they have not been publicized. Therefore, we seek to understand what else our CIOs have implemented in this paper-less office environment.

We also seek to understand the limitations our CIOs are facing in trying to implement a paper-less office. Most importantly, we seek to understand to what extent a paper-less office is a priority for our CIOs and their Commands.

## B. PURPOSE

The primary purpose of this thesis will be the study of the paper-less office concept in the naval medical community. In particular, this research will define what the paper-less office concept means to the naval medical community and what is associated with success in moving toward a paper-less office.

The quest for a paper-less office is important for many reasons:

a. The paper-less office may enable the concept of "doing more with less" to become more of a reality. By utilizing technology to the fullest, and distributing information wider and faster, the paper-less office supports "doing more with less." The paper-less office may become the epitome of working smarter, not harder.

b. The paper-less office concept may also create more efficient workers. Retrieving documents through electronic storage rather than through filing cabinets may reduce search time. Through the use of networks, PCs, and other technological applications, information will be readily available at a touch of a keystroke.

c. In many organizations, documents such as, letters, memos, and point papers, need to be reviewed by several individuals before being signed. To accomplish this

review, documents are routed to individuals in what's called the "chop chain." While the document is reviewed and passed on to the next individual, there is a chance of losing or misplacing the document. However, through the use of PC applications, documents in the chop chain can be automated, reducing the time a document spends in review.

d. Paper-less offices may reduce operating budgets by reducing paper usage. By reducing storage space normally used to archive organizational information, paper-less offices may save the Department of Defense millions of dollars annually by storing information electronically.

The paper-less office (meaning less paper vice no paper) study will show what Naval MTFs and clinic CIOs are doing with technology to move their commands towards a paper-less office. The findings of the study will create a central knowledge bank. This knowledge bank will consist of both accomplishments and current activities being undertaken by the MTFs CIOs in the paper-less office environment.

## C. SCOPE AND RESEARCH QUESTIONS

This thesis will include the population of MTFs and clinics' CIOs. Currently, there are approximately 15 MTFs, several hosting clinics. These MTFs are located in both the Continental United States and Outside Continental United States.

This thesis will exclude everything outside of the Naval MTF organization. However, these limitations apply to the survey and interviews. Literature reviews will include both private and public sector organizations.

**Questions**

1. What is the Naval Medical Community (i.e., MTFs, Clinics) doing to move towards a paper-less office?

2. What is associated with the move toward a paper-less office?

## D. METHODOLOGY

The research will be conducted in three phases:

Phase 1. We will create a survey to gather descriptive data on what MTFs consider a paper-less office and what is being done, if anything, to move their commands closer to the concept.

Phase 2. The survey will then be distributed to CIOs in Naval MTFs and clinics.

Phase 3. After receiving the survey responses, we will analyze the data using a statistical software package (SPSS).

## E. ORGANIZATION OF THESIS

This thesis is comprised of six chapters.

**Chapter I Introduction:** The purpose of this chapter is to introduce the research topic, research questions, methodology, and chapters in this thesis.

**Chapter II Literature Review:** The intent of this chapter is to survey the literature on the topic of the paper-less office. The literature defines a paper-less office in many ways, depending on the type of organization. However, all definitions include processes that involve the computer or electronic means.

**Chapter III Methodology:** This chapter will look at how we gathered information for this thesis. The areas examined in this chapter covers survey construction, pilot study, variables, the sample population, the administration of the survey, and the response rate of the survey.

**Chapter IV Data Analysis:** The intent of this chapter is to analyze the data. This chapter examines the descriptive data and the independent variables. Scales were formed from the independent items using factor analysis and correlations.

**Chapter V Discussion:** This chapter attempts to account for the lack of relationships between the independent and dependent variables. Methodological problems with the survey and the substantive issues for each hypotheses are examined.

**Chapter VI Conclusion:** The intent of this chapter is to answer the research questions proposed in the introduction and to make recommendations for further research based on the findings of this thesis.

## F. FINDINGS AND CONCLUSION

Using a .05 and .01 significance level, we found no significant intercorrolations among the scales, items, or dependent variables as shown in Appendix C & D. Therefore, there is no support for the hypotheses.

# II. LITERATURE REVIEW

## A. INTRODUCTION

With the advent of the information age, paper is no longer a practical medium to store information. The tasks of storing, retrieving, and distributing information are becoming more computer-based. As a result, the federal government, as well as local governments in all fifty states, are utilizing computers for storing, retrieving, and distributing information. However, "creating the paper-less office is like balancing the federal budget: Almost everyone says they want to get there, but saying it is easier than doing it" (Buchanan, 1995, p. 7).

This chapter will survey the literature on the topic of the paper-less office. The literature defines a paper-less office in many ways, depending on the type of organization. However, all definitions include processes that involve the computer or electronic means.

## B. PAPER-LESS OFFICE DEFINITION

The concept of paper-less office, for this thesis, is defined as "an environment where the transmission, storage, and retrieval of information is not completed through the medium of paper; it is completed through electronic data networks" (Hicks, 1997, p. 1).

The transmission, storage, and retrieval of information for a paper-less office is accomplished through seven elements: networks, internets and intranets, electronic data interchange, workflow management, document imaging, office automation and database applications.

## C. PAPER-LESS OFFICE ELEMENTS

### 1. Networking and Networking Applications

A network is nothing more than two or more computers connected together by a cable so that they can exchange information. Networks connect five groups:

- People and people;
- Electronic devices and electronic devices;
- Information sources and information sources;
- Organizations and organizations;
- People and electronic devices, information sources and/or organizations.

Richard A. Shaffer, founder of Technologic Partners, (a technology consulting company in New York City) and publisher of Technologic Computer Letter, states the networked computer that was supposed to create a paperless office worsened the paper pileup. Approximately 90 percent of corporate information is still being stored in unstructured formats, meaning, in a non-electronic format (Shaffer, 1994, p. 134). However, Paul M. Eng, states the paperless office is not a pipe dream. While approximately 95 percent of corporate information comes on paper or through fax machines, many companies are still working on achieving the paperless office (Eng, 1991).

The main networking applications discussed in this section are: (1) Internets and Intranets; (2) Electronic Data Interchange (EDI); (3) Workflow Management.

### a. Internets and Intranets

The internet is defined as the world's largest and most widely used network. Table 1 outlines the major internet capabilities: (Laudon, 1997, p. 274)

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| Capability | Functions Supported |
|---|---|
| E-mail | Person-to-person messaging, document sharing |
| Usenet newsgroups | Discussion groups on electronic bulletin boards |
| Chatting | Interactive conversations |
| Telnet | Log on to one computer system and do work on another |
| Gophers | Locate textual information using a hierarchy of menus |
| Archie | Search database of documents, software and data files available for downloading |
| FTP | Transfer files from computer to computer |
| World Wide Web | Retrieves, formats, and displays information (including text, audio, graphics, and video) using hypertext links |

**Table 1. Major Internet Capabilities**

Many organizations are beginning to build the internal networks called intranets based on Web technology. The intranet is defined as "an internal organizational network that is modeled upon the World Wide Web (i.e., defined as a set of standards for storing, retrieving, formatting, and displaying information using a client/server architecture, graphical user interfaces and a hypertext language that enables dynamic links to other documents)" (Laudon, 1997, p. 276). Intranets use the organization's existing network infrastructure, as well as the original software that was developed for the World Wide Web.

Organizations use internets and intranets in many ways. They use internets and intranets to make customer profiles, product inventories, policy manuals, and company telephone directories available to their employees and others. Information made available by internets and intranets means that employees and others are receiving up-to-

date information and management is reducing costs by eliminating paper, printing, and distributing costs.

### b. *Electronic Data Interchange (EDI)*

EDI is defined as the "direct computer-to-computer exchange between two organizations of standard business transaction documents such as invoices, bills of lading, or purchase orders" (Laudon, 1997, p. 255). EDI enhances document processing by reducing document handling, eliminating manual re-entry of data, improving accuracy of the data, and lowering ordering costs. EDI simplifies inventory management by processing orders faster, reducing purchase order lead times, forecasting supply needs more accurately, reducing levels of safety stocks, and reducing warehousing needs.

Public and private sector organizations are using EDI to streamline operations and reduce administrative costs. According to some experts, "EDI is a discipline forcing businesses to eliminate imperfect, wasteful, resource-consuming complexity in working practices" (Kimbrough & Moore, 1992, p. 35).

EDI saves money, time, and paper because transactions can be transmitted from one information system to another through a telecommunication's network. The printing and handling of paper is eliminated at one end and the inputting of data is eliminated at the other.

### c. Workflow Management

Workflow management is defined as "the process of streamlining business procedures so that documents can be moved easily and efficiently from one location to another" (Laudon, 1997, p. 309).

Business activities in both public and private sector organizations involve storing and distributing documents. American businesses generate approximately one billion pieces of paper daily. The insurance industry spends billions of dollars annually handling the paper. "At least 70 percent of this cost is for salaries, while another 20 percent are for storage costs. Much of the cost is attributed to physically transferring the document from one person to another; one industry executive put this cost at up to 50 dollars per document" (Kimbrough & Moore, 1992, p. 33). To streamline and control the paperwork, organizations are employing workflow management techniques.

Electronic workflows have reduced the cost of operations in many organizations by displacing paper. This is done by software that automates processes such as routing documents to different locations, scheduling and generating reports, and securing approvals while maintaining a complete audit trail. Additionally, two or more employees can work simultaneously on the same document, allowing for a quicker completion time.

### d. Document Imaging

"Document imaging systems are systems that convert documents and images into digital form so that they can be stored and accessed by the computer" (Laudon, 1997, p. 38). Many organizations are employing document-imaging systems to

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reduce problems stemming from paper-based workflow. Instead of organizations storing documents in files, cabinets or binders, document imaging allows for the paper-based document to be discarded by storing, retrieving, and manipulating a digitized image of the document.

### e. Office Automation

Office automation is defined as information technology that increases productivity in routine office work by automating office administration. Some examples are shown in Table 2 below.

| Manual Office Work | Office Automation |
|---|---|
| Plan of the Day Bulletin | Electronic Bulletin |
| Schedules & Calendars | Electronic Schedules & Calendars |
| Forms & Reports | Electronic Forms & Reports |
| Publications | Electronic Publications |
| Routing Slips | Automated Routing Slips |

**Table 2. Office Automation Capabilities**

Ninety percent of corporate information is still in non-electronic format (Shaffer, 1994). Therefore, office automation technologies are being used to help clear offices of paper and provide a wider and quicker distribution of information.

### f. Database Applications

A database is defined as "a self-describing collection of integrated records" (Kroenke, 1998, p. 14). The purpose of a database is to help organizations keep track of

things. The traditional database applications concern the tracking of items like orders, customers, jobs, employees, phone calls, or other items of interest to an organization.

Today, as databases have become more popular and readily available, database technology has been applied to new organizational areas, such as, databases for the internet or for organizational intranets. Databases are increasingly used to create and maintain multimedia applications.

## D. PUBLIC AND PRIVATE SECTOR COMPARISONS/CONTRAST

In a survey conducted by CIO Magazine and investment bank Morgan Stanley, Dean Witter, Discover and Company asked 208 high-level executives about their current technology portfolios and budgeting plans. The survey results showed that companies in different industries have certain preferences for different technologies. The survey revealed that business services/consulting and telecommunication companies are most aggressive adopters of new technology, while the government agencies lag behind significantly in adopting newer technologies (Slater, 1997).

This section will compare and contrast what is being done in selected public and private sector organizations (in relation to the seven elements) to create a paper-less office.

Table 3 shows public sector organizations that have implemented some of the category elements of a paper-less office. For example, VA hospitals are using networks to connect their outlying medical facilities to their automated records system (Breeden, 1997).

| Companies | Networking | Internets & Intranets | EDI | Workflow Management | Document Imaging/ Scanning | Electronic Forms & Reports | Database Applications |
|---|---|---|---|---|---|---|---|
| VA | X | | | | | | |
| VHA | X | | | | | X | |
| DoD Travel | X | | | | X | | |
| Pentagon | | | | | | | |
| U.S. FDA | X | | | X | X | | X |
| Dept FPC | | | | | X | | X |
| Bath Iron Works | | | | | X | | X |
| DFAS | X | | | X | X | | |
| IRS | | | | | X | X | X |
| Missouri Dept Reve | | | | | X | | |
| NUWC | X | X | | | | | |
| DLA | X | | X | | | | |
| Office Freedom of Info. | | | | | X | | |

Table 3. Public Sector Organization Categories

Legend: X = Elements have been completely implemented in the organizations (Implementation means usable, functional, and integrated into the organization.).

Note: Some Figures relating to organizations will be analyzed in the corresponding categories throughout this chapter.

The U.S. Food and Drug Administration, Center for Biologics Evaluation and Research, Division of Blood Applications implemented workflow management, document imaging, and a database application for their Blood Logging and Tracking System, which allows the Division of Blood Applications to improve efficiency and increase cost effectiveness (Breeden, 1997). The Office of Freedom of Information, where request processing is costly, paper and labor intensive, is improving customer service, output of document quality, process control, and management reporting through the implementation of document imaging (Breeden, 1997).

Table 3 shows that office automation has been implemented in the Veterans Health Administration (VHA). It is using a Computerized Patient Record System (CPRS) to track process notes, health and discharge summaries, and patient consultations.

The CPRS system is also used by the VA medical facilities to order supplies for labs, pharmacies, and radiology departments, thus, displacing paper (Breeden, 1997).

Table 4 shows private sector organizations that have implemented some of the category elements of a paper-less office. For example, Sandi Labs implemented a Web site on the internet to improve communication, distribute information more efficiently, and displace paper. The internet allows Sandi Labs to schedule conference rooms, query financial information, access official travel information, and submit/review SAND reports, all on-line (Buchanan, 1995).

| Companies | Networking | Internets & Intranets | EDI | Workflow Management | Document Imaging/ Scanning | Electronic Forms & Reports | Database Applications |
|---|---|---|---|---|---|---|---|
| Walmart | X | | X | | | | |
| Mutual Fund | X | | | X | X | | X |
| Pershing Security | X | | | X | X | | |
| Steamship | X | | | X | X | | |
| Sandi Labs | X | X | | | | | |
| Western Auto | | | | | X | X | |
| Univ Kansas MedCtr | X | | | | | | |
| PG&E | | | | | | | X |
| Connet Mutual Life In | X | | | X | X | X | |
| General Motors | X | | X | | | | |
| General Electric | X | | X | | | | |
| Sears Roebuck | | | | | | X | |
| Burlington Railroad | | | | | | X | |
| Target | | | | | | X | |
| Penn State | | | | | | X | |
| Owens Corning | X | X | | | | | |
| USAA Insurance Co. | X | | | | X | | |

**Table 4. Private Sector Organization Categories**

Note: Some Figures relating to organizations will be analyzed in the corresponding categories throughout this chapter.

The University of Kansas Medical Center use to spend $90,000 every year to print itemized telephone bills and distribute them to the center's 135 departments. Through networking the centers 4,200 computers, the bills are now stored and distributed electronically (Hicks, 1997).

General Motors, along with Walmart, in an effort to reduce paper, use EDI. In fact, they do not do business with suppliers on paper (Symonds, 1992).

Western Auto, Royal Bank of Canada, Penn State University, Connecticut Mutual Life, and Target are all utilizing office automation technologies to reduce paper (Symonds, 1992).

Therefore, in analyzing Tables 3 and 4, we find differences in the way the sectors are addressing category elements. For instance, Tables 3 and 4 show that the private sector organizations are using their category elements more extensively by implementing internets and intranets, EDI, and workflow management technologies more so than the public sector.

The public sector organizations are using networks. However, reviewing Tables 1 and 2 reveal public sector organizations appear to be lagging behind the private sector as far as utilizing network applications. This is also evident as stated in the CIO Magazine survey --government agencies lag behind significantly in adopting new technologies (Slater, 1997).

## 1. Networking

Paul M. Norling notes in his article "Network or Not work," "that networks are becoming a vital force within and between organizations." They are at the core of all organizational life (Norling, 1996, p. 42).

### a. Internets and Intranets

Both public and private sector organizations are networking internally and with other organizations through the use of internets and intranets (Laudon, 1997).

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Through the use of internets and intranets, organizations can distribute directives, forms, regulations, directories, and other information that once occupied paper. While Laudon states the benefits of the internet and intranet are reduced communication costs, enhanced communication and coordination, acceleration of knowledge distribution, and facilitation of electronic commerce, he fails to mention how this technology impacts organizations' paper usage (i.e., do organizations receiving information on-line print off the information or maintain the original electronic format?).

For example, Kansas City Power & Light is using the internet to become more competitive. Due to deregulation and tough competition, the utility company built a web site that lets more than 400,000 customers check their own power usage, pay their bills, learn how to keep electric costs down, and much more. The company saves the expense of processing paper-based bills and mailing them to customers. Therefore, in displacing paper and implementing one of the seven elements of a paper-less office, Kansas City Power & Light reduces costs and stays competitive (Jahnke, 1998).

Sari Kalin, author of "Blue on Blue," reveals that training, data sharing, and purchasing are completed through the use of internets and intranets in public and private sector organizations (Kalin, 1998). While intranets have not become as popular as the internet, many organizations are saving money while displacing the paper through the use of an organizational intranet. As an example, the Navy Undersea Warfare Center (NUWC) Newport implemented an intranet. Posting the "weeklies," summaries of base happenings, on the intranet is ridding NUWC of unnecessary paper. The NUWC is also purchasing on the intranet. As a result, they have reduced paper usage, paper flow, and time. An old-fashion paper purchase order in NUCW could take up to ten days to get

routed and approved. The electronic purchasing on the intranet uses a bankcard purchasing system that allows for automated approval and purchasing with next day delivery (Kalin, 1998).

The private sector also enjoys the benefits of implementing an intranet. Advanced Micro Devices Inc (AMD), based in Sunnyvale, California, utilizes an intranet to relieve purchasing managers from paperwork. The materials request is electronic and employees fill out the request and send it through e-mail to all individuals who are required to sign off and approve the order. Prior to this automation, AMD manually shuffled, processed, and waited on the paper before purchases were made (Santosus, 1998).

### b. Electronic Data Interchange (EDI)

The U.S. GSA Information Resources Management Service states that public and private sector organizations benefit from using EDI (GSA, June 1991). For example, "instead of sending off a paper form to order a new supply of rubber soles and waiting days for the paperwork to process, the manufacturer's computer will automatically enter the order in the sole maker's computer, which will simultaneously alert the warehouse, the factory, the accounting department, the billing department, and the shipping department" (Symonds, page 89, 1992).

General Electric Co. (GE), is saving tens of millions of dollars per year by eliminating almost four million business forms a year using EDI. The GE system involves 2,500 trading partners and handles 80 percent of its business transactions by direct EDI links (Symonds, 1992).

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In 1992, some 37,000 U.S. companies were actively involved in using EDI for their business transactions. Other private sector organizations, such as Wal-Mart Stores Inc., refuse to do business with paper suppliers. They must use EDI to receive orders and respond electronically. Wal-Mart uses EDI as a strategy of avoiding inventory buildup and price markdowns (Symonds, 1992).

The Defense Logistics Agency (DLA) has developed several automated procurement systems using EDI technology (GSA, 1991, p. 6). The three main systems include:

- The Standard Automated Material Management System (SAMMS)/Procurement by Electronic Data Exchange (SPEDE) which allows trading partners to request quotations, receive quotations, and place orders.

- The DLA Pre-Award Contracting System (DPACS) provides the data that a buyer will need to complete a solicitation package. This data includes item descriptions, specifications, drawings, packaging data, ship-to addresses, synopsis information, histories of past buys, and other open purchase requests or contracts for the National Stock Number (NSN). DPACS provides the buyer with a chronology of every action taken on a purchase request. It also provides solicitation and award forms, vendor mailing lists, contract clauses, and fill-ins. The award package is forwarded electronically to management and the legal department for review. Once approved and funded, the contract is maintained in electronic form for the period prescribed in the retention and disposition schedule.

- The Paperless Order Processing System (POPS) helps DLA and DOD contractors provide supplies and services to DOD facilities in a timely manner, thereby reducing stockpiling and warehousing costs.

EDI also connects public and private sector organizations. The following list details several instances where the federal government and industry exchange data electronically (GSA, 1991):

- The Department of Veteran Affairs (VA) hospitals and suppliers

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- The Federal Supply Service (FSS) of GSA and Federal contractors

- The DOD medical supply office and suppliers

- The Defense General Supply Center (DGSC) and DOD contractors using the Paperless Order Processing System (POPS)

- The Internal Revenue Service (IRS) and licensed tax preparers' use of the IRS Electronic Filing System

- The Security and Exchange Commission (SEC) and security brokers' use of the Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system

- The Commerce Department and exporters use of the Export License Application and Information Network (ELAIN)

According to the U.S. GSA Federal Electronic Data Interchange Initiative, the public and private sector organizations use EDI to (GSA, 1991, p. 3):

- Enhance Document Processing

- Eliminate Manual Re-entry of data

- Improve Accuracy of the Data

- Lower Ordering Costs

- Simplify Inventory Management

- Reduce Purchase Order Lead Times

- Forecast Supply Needs More Accurately

- Reduce Levels of Safety Stocks

- Reduce Warehousing Needs

- Improve Service to Industry

- Facilitate Prompt and Accurate Payment

- Lower costs to Vendors and Buyers

Thus, public and private sector organizations use EDI for the same reasons -- to become more productive and efficient organizations while ridding their desk of paper.

### c. *Workflow Management*

According to Information Management Consultant (IMC), private sector organizations turn to workflow management to maintain a competitive edge. While public sector organizations utilized workflow management to become more efficient (http://www.imcinc.com, no date).

According to the article in CHIPS Magazine, "Enterprise Information Management," public sector organizations utilize workflow management more for efficiency improvements. "Organizations that have successfully embraced workflow have reduced some process times by a factor of ten or more" (Long, 1998, p. 28).

A Mutual Fund Industry Leader (company name not disclosed), manages a total of approximately 15,000 to 20,000 documents daily in processing and administration. A workflow analysis and process re-engineering was performed for targeted functional areas. The information gathered was used to create high-level functional specifications and an imaging system (http://www.imcinc.com, no date).

The Mutual Fund Industry Leader, utilizing workflow management tools, enhanced workflow management processes which allows supervisors to monitor and

control workflow in their departments. This improved workflow of documents and reduced the number of callbacks that representatives use to make. The workflow management tools also reduced data entry requirements, provided more control over document location and made reconciliation of information more timely and accurate. Consequently, the organization is now more competitive as a result of displacing paper through the utilization of workflow management (http://www.imcinc.com, no date).

The public sector, on the other hand, utilizes workflow management techniques to improve efficiency and productivity (Long, 1998). Twenty-seven Defense Department facilities cut their travel costs and processing time in half by utilizing a workflow management technique and a new pilot called the Defense Travel System (DTS). "We have improved the process from the time the traveler starts working on the travel voucher through the authorizing official until it goes to the travel pay people. They can process it in the same day, link to Defense Finance and Accounting Service, link with the Federal Reserve, and get a payment in the bank in 48 hours" (Government Executive, No author, 1997, p. 58). This workflow management technique has processed 45,000 travel vouchers in a paperless environment. The DTS result was a reduction in government labor costs of processing travel requests/claims by 56 percent (Government Executive, No Author, 1997).

## 2. Document Imaging

As denoted in Tables 1 and 2, both the public and private sector organizations are utilizing document imaging to displace paper. Information Management Consultants (IMC) has shown both public and private sector organizations how to become more

productive and customer service oriented by implementing document imaging systems (http://www.imcinc.com). Therefore, IMC has improved productivity and customer service, while cutting costs by implementing document imaging systems.

As an example, Defense Finance Accounting Service (DFAS) receives between 15,000 and 75,000 documents on a daily basis. They also access paper repositories ranging from 500,000 to four million pieces of paper on a daily basis. In order for DFAS to meet their new productivity and cost goals, they implemented an advanced electronic imaging and workflow technology (http://www.imcinc.com, no date). Now, the paper-based information is captured digitally and automatically routed with workflow tools to the responsible individuals within DFAS. In this manner, DFAS has eliminated paper and improved paper-oriented business processes.

The United States Automobile Association (USAA) implemented the largest imaging system in the world, storing 1.5 billion pages. USAA receives more than 100,000 letters and mails more than 250,000 items daily. All incoming mail received daily is scanned and stored on optical disk. The original documents are thrown away, thereby eliminating paper and cutting costs (Laudon, 1997).

Bath Iron has an IS staff of 200 out of 8,300 employees. The IS staff reduced Bath's 166 million piece of paper per year to 36 million pieces per year in 3 years by using imaging systems. While elimination of over 130 million pieces of paper per year was not easy, Bath is reaping the benefits in costs savings (Baatz, 1996, p. 8).

## 3. Office Automation

Office automation brings technology into the office to manage information. For example, Western Auto is moving "6.2 million pages of documents every month into computers, including about 100 reports now being produced electronically that used to be printed on paper" (Hicks, 1997, p. 3).

"Moore Corporation, the leading producer of forms, estimates that forms account for one-third of the 2.5 trillion pages that U.S. business generates each year" (Symonds, 1992, p. 88). Therefore, private sector organizations, such as Royal Bank of Canada, Pennsylvania State University, Connecticut Mutual Life, and Target are freeing their organizations from paper by automating their forms and reports (Symonds, 1992).

Owens Corning, after moving into a new, high-tech, paper-free headquarters, is well on its way to saving 50 million dollars in annual operating costs. They attribute this savings to ridding the organization of paper. Table 5 shows some examples of Owens Corning transformation from paper to electronic medium (King, 1997)..

| What used to be..... | Is now...... |
|---|---|
| - A rolodex | - An electronic contact database |
| - A paper-based appointment book | - An online scheduler |
| - A paper-based product diagram | - An electronic "soft board" presentation |

Table 5. Comparison of Office Work

Owens Corning is conducting virtually all internal business electronically. Everything from scheduling staff meetings to reviewing new product designs. As a result, Owens Corning has eliminated 50 percent of its copiers, 50 percent of its printers,

and 60 percent of its fax machines. All policies, reports, product information, memos, announcements, and other news are now electronic (King, 1997).

The public sector is also using office automation to create more efficient and productive organizations. The Internal Revenue Service (IRS), which processes approximately 1.7 billion pieces of paper annually, launched an eight-billion-dollar program in 1992 to go nearly paperless by the decade's end. Their goal is to receive 100 million tax returns electronically. The benefits of doing an electronic tax return includes cutting return processing time from six weeks to two weeks and making old returns available instantly to taxpayers (Symonds, 1992).

## 4. Database Applications

Database applications can be found in small to large organizations. They range from single-user databases with a relatively small amount of data (less than ten megabytes) to large databases with hundreds of users and trillions of bytes of data. Public and private sector organizations that move towards a database environment encounter tangible, up front, costs benefits (Laudon, 1997).

As an example, the IRS processes millions of Currency Transaction Reports (CTRs) annually. The CTR collects data from financial institutions and uses this data to uncover criminal activities, such as money laundering (http://www.imcinc.com, no date). The task of collecting and reviewing this data is paper-based and prone to error. For the IRS to realize operational benefits, the manual process has been automated. The CTR forms are now scanned and the data is stored in a database. The database frees the IRS of paper and enables operators to correct data errors on-line. The image technology and

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database reduces processing errors and excessive document handling, while reducing costs (http://www.imcinc.com, no date).

An example of the private sector organization utilizing databases is Pacific Gas & Electric Company (PG&E), San Francisco, California. PG&E's new project deals with taking their computer system to the field in order to reduce operating costs and improve customer service. By using a pen-based field computer and customized software, PG&E is in the process of developing a sophisticated and complete database of its distribution poles (Hicks, 1997). PG&E estimates the field programs will give the company net savings of more than $280 million in pole repairs and replacements over the next 30 years (Hicks, 1997).

## E. TRANSITION

As discussed in this chapter, public and private sector organizations appear to be utilizing some of the seven elements of a paper-less office to try and rid the organization of paper. However, it appears (through the chapter discussion and Tables 1 and 2) that the private sector is taking a more aggressive approach towards planning, implementing, and utilizing the seven elements of a paper-less office. This is also apparent from the CIO Survey.

While public sector organizations are utilizing some of the seven elements of a paper-less office, we find little information on how the Naval Medical Community is taking advantage of information technology and utilizing the seven elements. Therefore, this thesis seeks to understand what, if anything, the Naval Medical Community is doing to create a paper-less office. If progress has not been made, we also seek to understand

what could be impeding that progress. Thus, a second goal in this thesis is to identify the determinants in helping organizations move toward a paperless office.

## F. HYPOTHESES

The previous section identified variation among organizations in the creation of a paper-less office. What accounts for this variation? We speculate that three determinants are important: resources, leadership, and technology.

### 1. Resources

Resources play a significant role when it comes to organizational technology. There are never enough hours in a day, especially when it comes to creating a new information technology process such as the paper-less office. In order for the paper-less office to become a reality, the organization must set aside time to properly research, plan, and implement the paper-less office. A quote from the literature puts it best: "one must invest time in networking activities and that time is often not available" (Norling, 1996, p. 46). This not only does time apply to networking, but to the entire information technology (IT) arena. Thus we can formulate the following hypothesis:

> H1: The greater amount of **time** in organizing and implementing a paper-less office, the higher the probability of success in creating a paper-less office.

Money is also an issue when it comes to new projects, programs, or information technology. Kaiser, while trying to become more competitive by implementing a web, is finding out that money is required in order to do the web the right way and a lack of it can create problems. "While this web is still considered a key strategic IT project, Kaiser's financial woes have taken their poll" (Kalin, 1998, p. 87).

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Public and private sector organizations are trying to become more competitive by implementing information technologies, however they soon find out that "technologies may require resources or funds that are in short supply, thereby limiting activities" (Norling, 1996, p. 46). There are variations in money expended. For example, the CIO survey found that generally, telecom, finance and business service companies devote a far greater portion of their money to IT than retailers, manufacturers and health-care companies" (Slater, 1997, p. 2). It therefore follows that:

> H2: The greater amount of **money** allocated towards a paper-less office, the higher the probability of success in creating a paper-less office.

Randy Shaffer, former Medical Service Corps CIO, states that the amount of staff assigned to a project determines how new projects, programs, and processes are successfully implemented. Thus, the appropriate amount of staff assigned to a project is crucial to the successful implementation of the project. Kerzner states that "it is impossible to achieve project success without permanently assigned personnel" (Kerzner, page 195, 1998). Therefore, it follows that:

> H3: The more **staff** assigned to work office automation activities, the higher the probability of success in creating a paper-less office.

> H3a: The more **permanent staff** assigned to work office automation activities, the higher the probability of success in creating a paper-less office.

Staff involvement is an important aspect of creating a paper-less office. "The successful implementation of any paperless office will depend on the willingness of 'techies' and front-liners to work together for better procedures and customer service" (Robertson, page 1, 1996). The following hypothesis is therefore formulated:

H4: The greater the **staff involvement** in planning, implementing, and evaluating a paper-less office, the higher the probability of success in creating a paper-less office.

CIO experience/training in information technology also plays a vital role in creating a paper-less office. Without the experience/training in information technology, the CIO's ability to strategically plan for future development of information technologies is greatly impaired. Experience and training gives the CIO the necessary tools required to design, plan, and implement new processes, such as, the paper-less office. The following hypothesis is therefore formulated:

H5: The greater the **CIO experience** and **training** with a paper-less office, the higher the probability of success in creating a paper-less office.

## 2. Leadership

Leaders in both the public and private sectors have a strong influence on what strategic goals are implemented in an organization. Leaders set the direction for an organization and establish the priority for creating a paper-less office.

The CIO's job is to take care of the organizations systems information needs, much like the CFO's job is to take care of the organizations financial needs. Therefore, part of the CIO's job is to "help the organization identify and adopt new IT" (Grover, Jeong, Kettinger, and Lee, 1993, p. 115). Implementation of information systems without the CIO's participation is unlikely. Consequently, the following hypothesis is formulated:

H6: The greater the **CIO's participation** in setting the organization's goals, the higher the probability of success in creating a paper-less office.

Salience is defined as keeping the project/program in the forefront of the executive forum. Once the CIO has presented a new project/program to the executive steering

committee, it is imperative that the CIO continue to restate the importance of the program/project to the command in both formal and informal settings. Randy Shaffer's professional experience has shown that by making a program/project salient throughout the command, he can ensure a higher probability in having a successful program/project. Thus, the following hypothesis is formulated:

H7: The greater amount of **salience** in the organization, the higher the probability of success in creating a paper-less office.

CIO communication with internal and external organizations has been evident as a key to successful information technology projects. "The CIO must communicate with the external environment" (Grover, Jeong, Kettinger, and Lee, 1993, p. 112) as well as "scan the external environment to keep up with technical changes and competition" (Grover, Jeong, Kettinger, and Lee, 1993, p. 112). Therefore, "in order to maintain the compatibility of interorganizational networks, CIOs may find themselves spending more time working with their equivalent in other organizations" (Grover, Jeong, Kettinger, and Lee, 1993, p. 112). Consequently, the following hypothesis is formulated:

H8: The greater the **CIO's communication** with CIO peers outside the command, the higher the probability of success in creating a paper-less office.

## 3. Technology

The creation of a paper-less office depends on information technology. Bath Iron Works, facing cutbacks in their IS budget ranging from 5 to 10 percent every year, states that just ditching equipment and reinvesting in entirely new equipment is not practical (Baatz, 1996, p. 8). This goes hand in hand with Randy Shaffer's professional experience as a CIO. He states that the creation of new projects are more likely to succeed if

organizations utilize their information technology that is already in place. By utilizing technology already in place, integrated, and functional, the command not only gains a new technology, they also save money in the process. Consequently, the following hypothesis is formulated:

> H9: The greater the utilization of **Information technology** already in place, the higher the probability of success in creating a paper-less office.

Gross and Lohman state that computers are more effective when the technology is buried in the system, thus "keeping it simple" for the user (Gross and Lohman, 1997). Therefore, the more user friendly the information technology, the more individuals will utilize the technology. (User friendly is defined as the ease of using the hardware/software, ease of maintenance, use, integration with other applications, manual, etc.). Therefore, the following hypothesis is formulated:

> H10: The more user friendly the **Information technology**, the higher the probability of success in creating a paper-less office in creating a paper-less office.

# III. METHODOLOGY

After consideration of the various methods of data collection, we came down to two choices, survey or direct observation. The survey option was determined to be best suited for this thesis. Due to the wide spread locations of our sample population made it almost impossible to study each site directly. The next question we had to deal with was how to conduct the survey: by telephone or by mail. Looking again at our sample population, we would have to make several phone calls at all hours of the night just to get the information. Another problem was that we would most likely have to make several telephone calls to one location to get in contact with the appropriate person. Based on this assessment, we decided to conduct a written survey that enabled us to gather information in a more timely and efficient manner.

This chapter, which is divided into four sections, will look at how we gathered information for this thesis. Section A covers survey construction, pilot study and the variables. Section B covers the sample population, how it was determined and the basis of the population. Section C covers the administration of the survey, who the surveys were sent to and how we guaranteed completeness. Section D covers the response rate of the survey.

## A. SURVEY CONSTRUCTION

The key to designing a good survey is to develop questions (items) related to our hypotheses. Items developed from the hypotheses provide us with the necessary input to test our hypotheses. Therefore, a large amount of time, concentration, and dedication was spent on developing good and fundamental survey questions. The following are some of

the questions used in the thought process to determine what consititues a good and fundamental survey question:

1. Questions need to be consistently understood.

2. Questions need to be consistently administrated or communicated to responents.

3. What constitutes an adequate answer should be consistently communicated.

4. Unless measuring knowledge is the goal of the question, all respondents should have access to the information needed to answer the question accurately.

5. Respondents must be willing to provide the answers called for in the question.

To make the whole survey flow and provide useful information, we went through several modifications. This was an evolving process and in the end we came up with a total of 26 survey questions. See Appendix A for the survey.

## 1. Web Based Administration

After looking at our overall methodology for data gathering we came to the conclusion that we wanted to develop a web-based survey. This approach allowed us to use modern technology while keeping a paperless office concept. Since we are inexperienced in developing a web-based survey, we acquired a software program that would assist us in the web-based survey development. The program we found was "Survey Solutions for the Web" developed by Perseus Development Corp, version 1.01G. The web-based design allowed us to access multiple users at the same time and from anywhere in the world.

## 2. Pilot Study

A pilot study was conducted using six people, three within the Naval Medical Community, and three fellow Information Technology Management (ITM) students (none of whom were familiar with the content of the survey). The object of the pilot study was to determine problem areas in terms of the questions and responses and to make corrections before the survey was ready for distribution.

The pilot study was conducted using the same web-based format of the final survey. The results showed that the survey, on average, was completed within 8 minutes and provided easy access to the responents.

## 3. Survey Construction Results

The pilot study identified several areas that could be improved. For example, the pilot study showed individuals preferred short answers to the questions that would not require a lot of thinking. Three questions seemed to be very simliar in format and sounded as if the questions were repeating themselves (related to the amount of budget). The survey software program allowed the respondents to submit the survey without answering all questions, this was one of the program limitations. Some of the questions were hard to understand and a little confusing on what was being asked.

Thus, changes were made to the original format. Our final revision divided the survey into two sections; demographic and general questions. The demographic section consisted of three questions related to the facility. The general questions section consisted of 23 questions, some with multiple parts. The whole design of the survey was

to make the process of completing very easy and to require minumum amount of time.  A copy of the completed survey can be reviewed in Appendix A.

## 4. Variables

Listed below are both the dependent and independent variables related to our hypotheses, also included is the definition and operationization of each variable.

### a. Dependent

1. Workflow Management is defined as the process of streamlining business procedures so that documents can be moved easily and efficiently from one location to another (Laudon, 1997, p. 309).

2. Imaging/Scanning is defined as systems that convert documents and images into digital and electronic forms that can be stored and accessed by a computer (Laudon, 1997, p. 38).

3. Internet is defined as the worlds largest and most widely used network.

4. Intranet is defined as an internal organizational network that is modeled after the internet design.

5. Database is defined as a collection of data stored on a computer storage medium, such as a disk, that can be used for more than one purpose.

6. Electronic Data Exchange (EDI) is defined as direct computer to computer exchange between two organizations of standard business transaction documents such as invoices, bills of lading, or purchase orders in machine readable form (Laudon, 1997, p. 255).

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7. Electronic Mail (E-mail) is defined as an electronic way to communicate. Email is much more convenient than ordinary mail or telephone calls because it arrives immediately but does not require the recipient to be present, nor does it interrupt anything thing else the recipient may be doing.

8. Office 97 is an integraded package that provides access to several different programs, that all work together. The program provides a tool to look at ways to increase office automation and reduce daily workload.

9. Automated Document Tracking (ADT) is defined as an automated way to know where your documents are and how to get access to them.

## b. Independent

Resources is defined as the amount of time, money and staff allocated to Naval Treatment Facility CIO's.

- **Time** is defined as the amount of hours in a given work day devoted to the organization and implementation of a paper-less office.
  - **Items to measure time.**
    1. Percent of workday engaged in activities that support/promote a paper-less office.
    2. Time available in planning activities that support/promote a paper-less office.
    3. Time available in implementing activities that support/promote a paper-less office.

- **Money** is defined as the amount of money allocated in the IS budget for technology processes.
  - **Technology Processes** is defined as hardware and software utilized in the automation of office activities.
  - **Items to measure money and technology processes.**
    1. Amount of money allocated in last years IS budget.

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2. Percentage of last years IS budget spent on paper-less office.
3. Amount of money allocated in current years IS budget.
4. Percentage of current years IS budget spent on paper-less office.
5. Amount of money proposed in next years IS budget.
6. Percentage of IS budget spent on paper-less office.

- **Staff** is defined as the number of personnel assigned to the Management Information Systems Department (i.e., full time, part time, contract, and temps).
    - **Office Automation Activities** is defined as day-to-day administrative office operations (i.e., letters, memos, messages, filing, routing paper, etc..).
    - **Permanent Staff** is defined as full time and part time employees working in the Management Information Systems Department.
    - **Items to measure staff and office automation.**
        1. Number of staff in Management Information Systems Department.
        2. Number of permanent staff in Management Information Systems Department.
        3. Number of additional permanent staff needed.
        4. Number of additional staff needed.

- **Staff knowledge** is defined as the amount of professional experience about automation of office activities and personal experience about automation of office activities attained by a staff member.
    - **Office Automation Activities** is defined as day-to-day administrative office operations (i.e., letters, memos, messages, filing, routing paper, etc..)
    - **Items to measure staff knowledge and office automation.**
        1. Departmental years of IT experience (i.e., full time, part time and contract)
        2. Staff knowledge of automation of office activities.
        3. Amount of professional/non-professional experience in automating office activities.

- **Staff** is defined as full time, part time, contract, and temporary personnel in the Management Information Department.
    - **Technology Processes** is defined as hardware and software utilized in the automation of office activities.
    - **Staff training** is defined as the amount of professional training attained by a staff member in office automation activities.
    - **Items to measure staff training and technology processes.**
        a. Department training budget for continuing education in technology processes.

      b. Percentage of staff trained in command applications/systems that support office automation activities.

      c. Number of training classes in office automation activities within the command.

      d. Kind of training classes offered in office automation activities within the command.

- **Staff involvement** is defined as staff participating in planning, implementing, and evaluating activities concerning paper-less office.
  - **Items to measure staff involvement.**
    a. Number of staff involved in planning a paper-less office.
    b. Number of staff involved in implementing a paper-less office.
    c. Number of staff involved in evaluating paper-less office of other organizations.

## 5. Leadership

**Leaders'** set the direction for an organization and decides on the paper-less office as a goal.

- **External communication** is defined as the communication between CIO's of various Naval MTFs.
  - **Technology Processes** is defined as hardware and software utilized in the automation of office activities.
  - **Items to measure external communication.**
    1. Amount of e-mail communication with outside CIO peers.
    2. Amount of telephone conversations with outside CIO peers.
    3. Number of conferences attended related to technology processes.

- **Command Staff** is defined as CO, XO, Directors, Department Heads, Civilians, Military, Contractors, Full Time, Part Time, and Temporary.
  - **Salience** is defined as the amount of internal communication between the CIO and command staff.
  - **Items to measure command staff and salience.**
    1. Amount of interaction between the CIO and the command staff.
    2. Amount of time CIO spends talking to or working with upper management (i.e., CO, XO, Directors, Department Heads)
    3. Percentage of command staff interest in paper-less office.

- **CIO's participation** is defined as the amount of participation and involvement the CIO has in the goal setting process of the organization.
  - **ADP Plan** is defined as a plan that contains hardware/software needed in support of the command information technology goals.

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- **Information Technology** is defined as a set of interrelated components that collect, process, store, and distribute information to support decision making and control in an organization.
- **Items to measure CIO's participation and information technology.**
    1. Priority placed on paper-less office in the Command.
    2. Amount of time spent in goal setting meetings.
    3. Is the CIO a part of the ESC.
    4. Does the CIO have an ADP Plan.
    5. Does the ADP Plan include paper-less office.
    6. Is the ADP Plan a part of the Commands Strategic Plan.

## 6. Technology

**Information Technology** influences the movement of an organization towards paper-less office.

- **Information Technology** is defined as a set of interrelated components that collect, process, store, and distribute information to support decision making and control in an organization.
    - **ADP Technology** is defined as hardware/software that supports information technology.
    - **Utilization of ADP technology** is defined as the usage of already existing ADP hardware and software in support of information technology.
    - **Items to measure information technology and utilization.**
        1. Percentage of ADP technology reuse rate.
        2. Percentage of ADP technology disposal rate.
        3. Percentage of ADP technology new equipment purchase rate.

- **User Friendly** is defined as the ease of using the hardware/software (i.e., ease of maintenance, use, integration with other applications, manual, etc...)
    - **ADP Technology** is defined as hardware/software that supports information technology.
    - **Items to measure user friendly and ADP technology.**
        1. Does the software provide a user-friendly interface.
        2. Are the manuals easy to read and interpret.
        3. Is the ADP technology easy to install/configure.
        4. Is the ADP technology easy to integrate with other systems.

# B. SAMPLE POPULATION

The Paper-less Office Survey was conducted on all Naval Medical Treatment Facilities (MTFs). Our sample population of all DoD Medical Treatment Facilities

consisted of a total of 27 installations throughout the world. The total number of MTFs was derived from a master database maintained by the Bureau of Naval Medicine, in Washington DC. The input for this survey was to be provided by the Chief Information Officer (CIO) of each facility. Only one submission would be allowed per facility. To help ensure no duplicates an additional demographic question was added.

As Medical Service Corps officers, we were very interested in what the different Naval Medical Facilities were doing to move toward a paper-less environment. Given the big push for automation in our facilities, we wanted to know if there were any changes in the way the MTFs are conducting business on a daily basis.

## C. ADMINISTRATION OF SURVEY

As stated, this survey was all done via a web-based design. There were several steps involved in administering the survey, they are as follows:

1. An address listing of all Naval Medical Chief Information Officers (CIOs) was obtained from the Navy Specality Officer for this area.

2. The addresses were double checked to make sure no facility was left off the list.

3. An e-mail was sent to all CIOs on this list informing them about the survey, its purpose, its availablity, location, and how they could submit it upon completion.

4. Once the CIOs completed and submitted the survey, it was then automatically transmitted to our personal e-mail account.

5. After receipt of the survey information via e-mail, it was then incorporated into the SPSS database for data manipulation.

The web-based survey did have its limitations. There was no way to make sure that a CIO answered all the questions before it was transmitted. This was a big software limitation. To ensure we did not get duplicate copies from one command and for tracking purposes, additional demographic questions were added, that included the name of the facility. A compete breakdown of responses is listed in Table 6 below.

In dealing with incomplete submission of survey information, the following process was followed:

1. A return e-mail was sent to the command in question, with a listing of all items they did not provide responses to. The e-mail was used to ensure we had all required information and no missing data.

2. The CIO then responded via return e-mail with the requested information.

3. If information was still missing or we needed further clarification, we called the CIO.

To help increase our response rate, additional e-mail messages were sent to remind all CIOs how important their input was to our research. We sent out a total of four reminders.

We did encounter some problems in using a web-based process. The issues are listed below and as far as we know only effected the overseas commands.

1. Access to the system was slow. Two diffent locations made this comment, one from Italy and the other from Hawaii.

2. A few respondents had a hard time trying to submit the data after the survey was complete. They were getting a "can not resolve the address" response.

3. A few respondents had to click on the "submit survey" button more than once to complete the process.

## D. RESPONSE RATE

Table 6 shows the survey response and non-response comparisons. Several surveys were received incomplete. Therefore, the needed information was obtained by further e-mails and telephone calls. A total of 20 surveys were returned, giving us a response rate of 71.43.

| State | Response | Non-Response |
|---|---|---|
| **California** | | |
| Naval Hospital Lemoore | 1 | |
| Naval Hospital San Diego | 1 | |
| Naval Hospital Camp Pendleton | | 1 |
| Naval Hospital Twenty-Nine Palms | 1 | |
| **Connectict** | | |
| Naval Hospital Groton | 1 | |
| **Florida** | | |
| Naval Hospital Pensacola | 1 | |
| Naval Hospital Jacksonville | 1 | |
| **Illinois** | | |
| Naval Hospital Great Lakes | 1 | |
| **Maryland** | | |
| Naval Hospital Bethesda | 1 | |
| **New Hampshire** | | |
| Naval Medical Clinic Portsmouth | | 1 |
| **North Carolina** | | |
| Naval Hospital Camp Lejeune | | 1 |
| Naval Hospital Cherry Point | | 1 |
| **Rhode Island** | | |
| Naval Hospital Newport | | 1 |
| **South Carolina** | | |
| Naval Hospital Charleston | 1 | |
| Naval Hospital Beaufort | 1 | |

| | | |
|---|---|---|
| **Texas** | | |
| Naval Hospital Corpus Christi | 1 | |
| **Virgina** | | |
| Naval Hospital Portsmouth | 1 | |
| **Washington** | | |
| Naval Hospital Oak Harbor | | 1 |
| Naval Hospital Bremerton | 1 | |
| **Cuba** | | |
| Naval Hospital Guantanamo Bay | 1 | |
| **Guam** | | |
| Naval Hospital Guam | 1 | |
| **Italy** | | |
| Naval Hospital Naples | 1 | |
| Naval Hospital Sigonella | 1 | |
| **Japan** | | |
| Naval Hospital Okinawa | 1 | |
| Naval Hospital Yokosuka | | 1 |
| **Puerto Rico** | | |
| Naval Hospital Roosevelt Roads | | 1 |
| **Iceland** | | |
| Naval Hospital Keflavik | 1 | |
| **Spain** | | |
| Naval Hospital Rota | 1 | |
| **Totals** | **20** | **8** |
| | | |
| **Total MTFs** | **28** | |
| **Return Rate** | **71.43%** | |

Table 6. Response/Non Response List

# E. ANALYSIS

SPSS version 7.5 software package was used to conduct the analysis. Factor analysis and correlations were employed to operationalize the dependent and independent variables and correlations were used to test the hypotheses.

# IV. DATA ANALYSIS

## A. DESCRIPTIVE STATISTICS

The paper-less office survey findings in this chapter are reported in 5 categories: respondent demographics, resources, leadership, information technology and dependent variables.

### 1. Demographics

Tables 7 and 8 provides a breakdown of the MTF's demographics.

| Bed Size of MTFs | Beds | Frequency | Percent |
|---|---|---|---|
| | 0-50 beds | 13 | 65% |
| | 51-100 beds | 3 | 15% |
| | 101-150 beds | 2 | 10% |
| | 151-200 beds | 0 | 0% |
| | 200+ beds | 2 | 10% |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 30.75 | 30 | 30 | 1.29 |

Table 7.  Bed Size of MTFs

As shown in Table 7, the majority of the respondents, 16 (80%) work in Naval MTFs containing 0-100 beds.  Two (10%) of the CIOs report working in Naval MTFs containing 200+ beds.

| MTF Clinics | Other Medical Clinics | Frequency | Percent |
|---|---|---|---|
| | Yes | 17 | 85% |
| | No | 3 | 15% |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 1.15 | 1 | 1 | 0.37 |

Table 8. MTF Clinics

Table 8 shows 17 (85%) of the CIOs state having responsibility for other medical clinics.

## 2. Resources

The respondents were asked resource questions concerning time, money, and staff. Tables 9 and 10 provide a breakdown of the findings for each time item.

| Hours Day Planning | Hours | Frequency | Percent |
|---|---|---|---|
| | 0 minutes | 1 | 5% |
| | 0.25 minutes | 1 | 5% |
| | 0.5 minutes | 4 | 20% |
| | 1 hour | 8 | 40% |
| | 2 hours | 3 | 15% |
| | 4 hours | 2 | 10% |
| | 8 hours | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 1.61 | 1 | 1 | 1.85 |

Table 9. Hours a Day Planning

Table 9 reveals 14 (70%) of the CIOs reported they spend an hour or less per day on planning a paper-less office, with a mean of 1.61 hours a day.

| Hours Day Implementing | Hours | Frequency | Percent |
|---|---|---|---|
| | 0 minutes | 1 | 5% |
| | 0.01 minutes | 1 | 5% |
| | 0.25 minutes | 1 | 5% |
| | 0.3 minutes | 1 | 5% |
| | 0.5 minutes | 3 | 15% |
| | 1 hour | 6 | 30% |
| | 2 hours | 2 | 10% |
| | 3 hours | 1 | 5% |
| | 4 hours | 2 | 10% |
| | 5 hours | 1 | 5% |
| | 8 hours | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 1.80 | 1 | 1 | 2.05 |

Table 10. Hours a Day Implementing

As shown in Table 10, thirteen (65%) of the CIOs spend an hour or less per day on implementing activities that support/promote a paper-less office. Table 10 shows CIOs spend 1.80 hours per day, on average, implementing activities that support/promote a paper-less office.

| $ Allocated in IS Budget | $ | Frequency | Percent |
|---|---|---|---|
| | Less than $100,000 | 4 | 20% |
| | $101,000 to 200,000 | 2 | 10% |
| | $201,000 to 300,000 | 6 | 30% |
| | $301,000 to 400,000 | 1 | 5% |
| | $401,000 to 500,000 | 1 | 5% |
| | $501,000+ | 6 | 30% |
| Mean | Median | Mode | Standard Deviation |
| 5.55 | 5 | 5 | 1.93 |

**Table 11. $ Allocated in IS Budget**

Tables 11, 12, and 13 provides a breakdown of the findings for each money item. Table 11 reveals 12 (60%) of the respondents report their annual allocated IS budget is $300,000 dollars or less. Another 6 (30%) report their annual allocated IS budget is $501,000 dollars plus. The average amount of money allocated to CIOs IS budget on an annual basis is $201,000 to $300,000.

| % IS Budget Actually Spent on PLO | | Frequency | Percent |
|---|---|---|---|
| | Less than 20% | 10 | 50% |
| | 21-40% | 4 | 20% |
| | 41-60% | 4 | 20% |
| | 61-80% | 2 | 10% |
| | 81-100% | 0 | 0% |
| Mean | Median | Mode | Standard Deviation |
| 9.90 | 9.50 | 9 | 1.07 |

**Table 12. % IS Budget Actually Spent on PLO**

Table 12 reveals that 10 (50%) of the CIOs report spending less than 20% of the allocated budget on creating a paper-less office. However, 2 (10%) of the CIOs report spending 61-80% of the allocated budget on creating a paper-less office.

| % Spent Dept Training | | Frequency | Percent |
|---|---|---|---|
| | Less than 20% | 13 | 65% |
| | 21-40% | 4 | 20% |
| | 41-60% | 1 | 5% |
| | 61-80% | 2 | 10% |
| | 81-100% | 0 | 0% |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 9.60 | 9.00 | 9 | 1.05 |

Table 13. % Spent Dept Training

Table 13 shows 13 (65%) of the respondents report spending less than 20 percent of the IS budget on departmental continuing education in technology processes. Only 2 (10%) spend 61-80 percent of the IS budget on departmental continuing education in technology processes.

| Staff Assigned to MID | Staff Members | Frequency | Percent |
|---|---|---|---|
| | 8 | 1 | 5% |
| | 9 | 3 | 15% |
| | 11 | 1 | 5% |
| | 12 | 2 | 10% |
| | 16 | 1 | 5% |
| | 18 | 1 | 5% |
| | 20 | 1 | 5% |
| | 22 | 1 | 5% |
| | 24 | 1 | 5% |
| | 25 | 1 | 5% |
| | 28 | 2 | 10% |
| | 31 | 1 | 5% |
| | 32 | 1 | 5% |
| | 43 | 1 | 5% |
| | 70 | 1 | 5% |
| | 88 | 1 | 5% |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 25.75 | 21 | 9 | 20.73 |

Table 14. Staff Assigned to MID

Tables 14-19 provides a breakdown of findings for each staff item. As shown in Table 14, ten (50%) of the respondents report having 22 or more staff members assigned to MID. However, the average amount of staff members assigned to the MID department in Naval MTFs is 25.75.

| Perm Staff Assigned To MID | Staff Members | Frequency | Percent |
|---|---|---|---|
| to MID | 7 | 2 | 10% |
| | 8 | 2 | 10% |
| | 9 | 2 | 10% |
| | 11 | 2 | 10% |
| | 12 | 2 | 10% |
| | 15 | 1 | 5% |
| | 18 | 2 | 10% |
| | 20 | 1 | 5% |
| | 24 | 1 | 5% |
| | 31 | 1 | 5% |
| | 32 | 1 | 5% |
| | 43 | 1 | 5% |
| | 70 | 1 | 5% |
| | 71 | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 21.8 | 13.5 | 7 | 19.25 |

Table 15. Perm Staff Assigned to MID

As shown in Table 15, fourteen (70%) of the CIOs report having 20 or less permanent staff members assigned to MID. Six (30%) of the CIOs report having 24 or more permanent staff members assigned to MID. The mean shows that 21.8 permanent staff are assigned to MID.

| Add Staff Needed in MID | Staff | Frequency | Percent |
|---|---|---|---|
| | 0 | 4 | 20% |
| | 1 | 3 | 15% |
| | 2 | 3 | 15% |
| | 3 | 5 | 25% |
| | 4 | 1 | 5% |
| | 5 | 3 | 15% |
| | 6 | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 2.45 | 2.50 | 3 | 1.88 |

Table 16. Add Staff Needed in MID

Table 16 reveals 10 (50%) of the CIOs report needing 3 or more additional staff members in MID. The average additional staff members needed in the Naval MTFs is 2.45.

| Staff Involved in Planning | Staff | Frequency | Percent |
|---|---|---|---|
| | 0 | 2 | 10% |
| | 1 | 5 | 25% |
| | 2 | 3 | 15% |
| | 3 | 4 | 20% |
| | 4 | 2 | 10% |
| | 5 | 1 | 5% |
| | 6 | 1 | 5% |
| | 8 | 1 | 5% |
| | 9 | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 3.15 | 3 | 1 | 2.48 |

Table 17. Staff Involved in Planning

As shown in Table 17, seventeen (85%) of the CIOs report they have 5 or less staff members involved in planning a paper-less office, with a mean of 3.15.

| Staff Involved in Implementing | Staff | Frequency | Percent |
|---|---|---|---|
| | 0 | 3 | 15% |
| | 1 | 3 | 15% |
| | 2 | 5 | 25% |
| | 3 | 2 | 10% |
| | 4 | 1 | 5% |
| | 5 | 1 | 5% |
| | 7 | 2 | 10% |
| | 8 | 1 | 5% |
| | 11 | 1 | 5% |
| | 24 | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 4.25 | 2 | 2 | 5.52 |

Table 18. Staff Involved in Implementing

Table 18 shows 15 (75%) of the CIOs report 5 or less staff members involved in implementing a paper-less office. The average amount of staff members involved in implementing a paper-less office is 4.25.

| Staff Involved in Evaluating | Staff | Frequency | Percent |
|---|---|---|---|
| | 0 | 3 | 15% |
| | 1 | 7 | 35% |
| | 2 | 3 | 15% |
| | 3 | 3 | 15% |
| | 4 | 1 | 5% |
| | 8 | 1 | 5% |
| | 10 | 1 | 5% |
| | 15 | 1 | 5% |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 2.95 | 1.50 | 1 | 3.82 |

**Table 19. Staff Involved in Evaluating**

As shown in Table 19, seventeen (85%) have 4 or less staff members involved in evaluating a paper-less office. The average amount of staff members involved in evaluating a paper-less office is 2.95.

## 3. Leadership

The respondents were asked leadership questions concerning CIO experience/training, CIO communication, salience, and CIO participation. Tables 20 and 21 provides a breakdown of the findings for each CIO experience/training item.

| Years Workflow Mgmt (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 7.80 | 5.50 | 5 | 5.87 |
| | | | |
| Years Scanning Equip (CIO Exp/Train) | | | |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 4.20 | 3 | 2 | 2.93 |
| | | | |
| Years Imaging (CIO Exp/Train) | | | |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 3.20 | 2 | 2 | 2.46 |

| Years Internet (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 6.55 | 6 | 3 | 3.56 |

| Years Intranet (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 3.70 | 2 | 2 | 3.39 |

| Years Network (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 6.85 | 5.50 | 5 | 4.03 |

| Years DB (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 8.50 | 8 | 5 | 4.39 |

| Years EDI (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 3.60 | 3 | 1 | 3.17 |

| Years E-mail (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 8.40 | 8 | 5 | 3.93 |

| Years Office 97 Applications (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 2.08 | 2 | 2 | 1.03 |

| Years ADT (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 2.15 | 2 | 0 | 2.52 |

| Years Other (CIO Exp/Train) | | | |
|---|---|---|---|
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 28.75 | 29 | 29 | 0.64 |

Table 20.  Years CIO Experience/Training

As shown in Table 20, CIOs average 7.80 years experience in workflow management, 6.55 years in Internet experience, 6.85 years in networking, 8.50 years in database experience, and 8.40 years in e-mail experience. CIOs report a mean of 4.20 years in scanning experience/training and 3.20 years in imaging experience.

| Years CIO | Years | Frequency | Percent |
|---|---|---|---|
| | 1 year | 1 | 5 |
| | 2 years | 11 | 55 |
| | 2.5 years | 1 | 5 |
| | 3 years | 1 | 5 |
| | 6 years | 2 | 10 |
| | 8 years | 2 | 10 |
| | 9 years | 1 | 5 |
| | 19 years | 1 | 5 |
| Mean | Median | Mode | Standard Deviation |
| 4.23 | 2 | 2 | 4.26 |

Table 21. Years CIO

Table 21 provides a breakdown of the findings for the number of years experience the MTF CIOs possess. As shown in Table 21, twelve (60%) of the CIOs report having 2 or less years of experience as a CIO, with a mean of 4.23 years.

| E-mail Rec/Send Daily | E-mail | Frequency | Percent |
|---|---|---|---|
| | Less than 10 | 16 | 80% |
| | 11-20 | 2 | 10% |
| | 21-30 | 1 | 5% |
| | 31-40 | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 14.35 | 14 | 14 | 0.81 |

Table 22. E-mail Receive/Send Daily

Tables 22, 23, and 24 provide a breakdown of the CIO communication items. Table 22 shows 18 (90%) of the CIOs receive/send twenty or less e-mail messages on a daily basis. Only 2 (10%) of the CIOs report receiving/sending more than 20 messages on a daily basis.

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| Phone Calls Receive/Send Daily | Phone Calls | Frequency | Percent |
|---|---|---|---|
| | Less than 10 | 18 | 90% |
| | 11-20 | 2 | 10% |
| | 21-30 | 0 | 0% |
| | 31-40 | 0 | 0% |
| Mean | Median | Mode | Standard Deviation |
| 14.10 | 14 | 14 | 0.31 |

Table 23.  Phone Calls Receive/Send Daily

Table 23 shows 18 (90%) of the CIOs receive/send ten or less telephone calls on a daily basis.  Only 2 (10%) of the CIOs report receiving/sending 11-20 telephone calls on a daily basis.

| Conferences Attend Annually | Conferences | Frequency | Percent |
|---|---|---|---|
| | 1-2 | 16 | 80% |
| | 3-4 | 4 | 20% |
| Mean | Median | Mode | Standard Deviation |
| 20.00 | 20 | 20 | 41.00 |

Table 24. Conferences Attend Annually

Table 24 shows 16 (80%) of the CIOs report attending 1-2 conferences related to technology processes on an annual basis.  Only 4 (20%) of the CIOs report attending 3-4 conferences related to technology processes on an annual basis.

| Hours Work Per Week w/Upper Mgmt | Hours | Frequency | Percent |
|---|---|---|---|
| | 0 minutes | 2 | 10% |
| | 0.25 minutes | 2 | 10% |
| | 0.5 minutes | 2 | 10% |
| | 1 hour | 8 | 40% |
| | 2 hours | 3 | 15% |
| | 4 hours | 2 | 10% |
| | 10 hours | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 1.67 | 1 | 1 | 2.25 |

Table 25. Hours Work Per Week w/Upper Mgmt

Tables 25, 26, and 27 provides a breakdown of the salience items. As shown in Table 25, fourteen (70%) of CIOs work an hour or less per week with upper management on creating a paper-less office, with a mean of 1.67 hours per week.

| Hours Day Work w/Command Staff | Hours | Frequency | Percent |
|---|---|---|---|
| | 0 hours | 1 | 5% |
| | 0.01 minutes | 1 | 5% |
| | 0.25 minutes | 2 | 10% |
| | 0.3 minutes | 1 | 5% |
| | 0.5 minutes | 4 | 20% |
| | 1 hour | 5 | 25% |
| | 2 hours | 3 | 15% |
| | 3 hours | 2 | 10% |
| | 4 hours | 1 | 5% |
| Mean | Median | Mode | Standard Deviation |
| 1.19 | 1 | 1 | 1.12 |

Table 26. Hours Day Work w/Command Staff

As shown in Table 26, fourteen (70%) of CIOs work an hour or less with command staff on creating a paper-less office. The average amount of time CIOs spend with command staff on creating a paper-less office is 1.19 hours.

| CO Support | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 2 | 10% |
| | 2 | 2 | 10% |
| | 3 | 4 | 20% |
| | 4 | 6 | 30% |
| Highest | 5 | 6 | 30% |
| Mean | Median | Mode | Standard Deviation |
| 3.60 | 4 | 4 | 1.31 |

Table 27. CO Support

As shown in Table 27, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 12 (60%) of the MTF COs support creating a paper-less office, is in the upper level of the scale (the values of 4 and 5), with a mean of 3.60.

| PLO Fit Dept Priority Scheme | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 0 | 0% |
| | 2 | 1 | 5% |
| | 3 | 10 | 50% |
| | 4 | 5 | 25% |
| Highest | 5 | 4 | 20% |
| Mean | Median | Mode | Standard Deviation |
| 3.60 | 3 | 3 | 0.88 |

Table 28. PLO Fit Dept Priority Scheme

Tables 28 and 29 provides a breakdown of CIO participation items. Table 28 shows, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 9 (45%) of the CIO respondents report that paper-less office fits into their departmental priority scheme, is in the upper level of the scale (the values of 4 and 5), with a mean of 3.60.

| CIO Participate | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 2 | 10% |
| | 2 | 2 | 10% |
| | 3 | 6 | 30% |
| | 4 | 6 | 30% |
| Highest | 5 | 4 | 20% |
| Mean | Median | Mode | Standard Deviation |
| 3.40 | 3.50 | 3 | 1.23 |

Table 29. CIO Participate in Command's Strategic Planning

As shown in Table 29, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 10 (50%) of the CIOs participate in the command's strategic planning process, is in the upper level of the scale (the values of 4 and 5), with a mean of 3.40.

The respondents were asked questions concerning information technology. Tables 30-37 provides a breakdown of the findings for each information technology item.

| Info Tech Easy Install/Configure | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 0 | 0% |
| | 2 | 3 | 15% |
| | 3 | 5 | 25% |
| | 4 | 7 | 35% |
| Highest | 5 | 5 | 25% |
| Mean | Median | Mode | Standard Deviation |
| 3.15 | 3 | 4 | 0.93 |

Table 30. Info Tech Easy Install/Configure

As shown in Table 30, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, twelve (60%) of the Naval MTFs state information technology (IT) is easy to install/configure, is in the upper level of the scale (the values of 4 and 5), with a mean of 3.15.

| Info Tech Easy Integrate w/Other Systems | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 2 | 10% |
| | 2 | 4 | 20% |
| | 3 | 8 | 40% |
| | 4 | 6 | 30% |
| Highest | 5 | 0 | 0% |
| Mean | Median | Mode | Standard Deviation |
| 2.90 | 3 | 3 | 0.97 |

Table 31. Info Tech Easy Integrate w/Other Systems

Table 31 shows, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 14 (70%) of the CIOs state that IT, on a scale of 3 and below, is easy to integrate with other systems. Only 6 (30%) of the CIOs state that IT is easy to integrate with other systems on a scale of 4, with a mean of 2.90.

| Info Tech Reused | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 0 | 0% |
| | 2 | 3 | 15% |
| | 3 | 5 | 25% |
| | 4 | 7 | 35% |
| Highest | 5 | 5 | 25% |
| Mean | Median | Mode | Standard Deviation |
| 3.70 | 4 | 4 | 1.03 |

Table 32. Info Tech Reused Annually

As shown in Table 32, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, twelve (60%) of the CIOs report Naval MTF IT is reused annually, is in the upper level of the scale (the values of 4 and 5), with a mean of 3.70.

| Info Tech Disposed | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 3 | 15% |
| | 2 | 10 | 50% |
| | 3 | 6 | 30% |
| | 4 | 1 | 5% |
| Highest | 5 | 0 | 0% |
| Mean | Median | Mode | Standard Deviation |
| 2.25 | 2 | 2 | 0.79 |

Table 33. Info Tech Disposed Annually

Table 33 shows, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 7 (35%) of the CIOs report disposing IT on an annual basis, is in the middle level of the scale (the values of 3 and 4), with a mean of 2.25.

| Purchase Info Tech | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 1 | 5% |
| | 2 | 0 | 0% |
| | 3 | 12 | 60% |
| | 4 | 4 | 20% |
| Highest | 5 | 3 | 15% |
| Mean | Median | Mode | Standard Deviation |
| 3.40 | 3 | 3 | 0.94 |

Table 34. Purchase Info Tech Annually

Table 34 shows, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 7 (35%) of the CIOs report purchasing information technology annually, is in the upper level of the scale (the values of 4 and 5), with a mean of 3.40.

| Command ADP Plan | Plan | Frequency | Percent |
|---|---|---|---|
| | Yes | 18 | 90% |
| | No | 2 | 10% |
| Mean | Median | Mode | Standard Deviation |
| 1.10 | 1 | 1 | 0.31 |

Table 35. Command Have ADP Plan

As shown in Table 35, the majority of the CIOs, 18 (90%), report having an ADP Plan.

| PLO in ADP | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 1 | 5% |
| | 2 | 2 | 10% |
| | 3 | 9 | 45% |
| | 4 | 4 | 20% |
| Highest | 5 | 2 | 10% |
| | No ADP Plan | 2 | 10% |
| Mean | Median | Mode | Standard Deviation |
| 5.50 | 3 | 3 | 7.07 |

Table 36. PLO Included in ADP

Table 36 shows, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 6 (30%) of the CIOs report the paper-less office is incorporated in the ADP Plan on a scale of 4 and 5. However, 12 (60%) of the CIOs report paper-less office inclusion in the ADP Plan, is in the lower level of the scale (the values of 1,2 and 3), with a mean of 5.50.

| ADP in Strategic Plan | Lickert Scale | Frequency | Percent |
|---|---|---|---|
| Lowest | 1 | 1 | 5% |
| | 2 | 2 | 10% |
| | 3 | 9 | 45% |
| | 4 | 1 | 5% |
| Highest | 5 | 5 | 25% |
| | No ADP Plan | 2 | 10% |
| **Mean** | **Median** | **Mode** | **Standard Deviation** |
| 5.65 | 3 | 3 | 7.05 |

**Table 37. ADP Plan Incorporated into Strategic Plan**

As shown in Table 37, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, 6 (30%) of the CIOs report the ADP Plan being incorporated into the command's strategic plan, is in the upper level of the scale (the values of 4 and 5), with a mean of 5.65.

## 4. Dependent Variables

Figures 1 through 10 show the responses on the nine items that define the dependent variable. The respondents reported on a scale of 1-5 with 1 being the lowest and 5 being the highest.
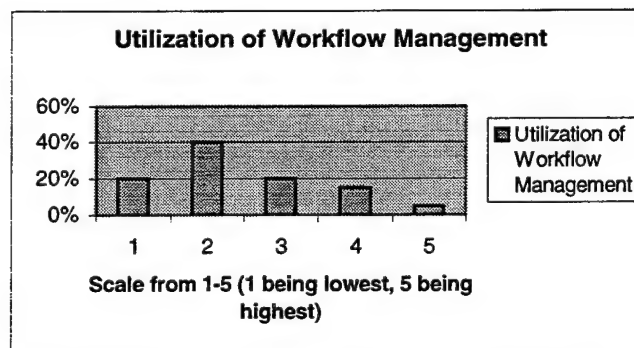


**Figure 1. Utilization of Workflow Management**

Figure 1 shows 15 percent of the CIOs utilize workflow management technologies, is in the upper level of the scale (the values of 4 and 5). Forty percent of

the CIOs report using workflow management techniques, is in the lower level of the scale

(the value of 2).

**Utilization of Imaging/Scanning**

Scale from 1-5 (1 being lowest, 5 being highest)
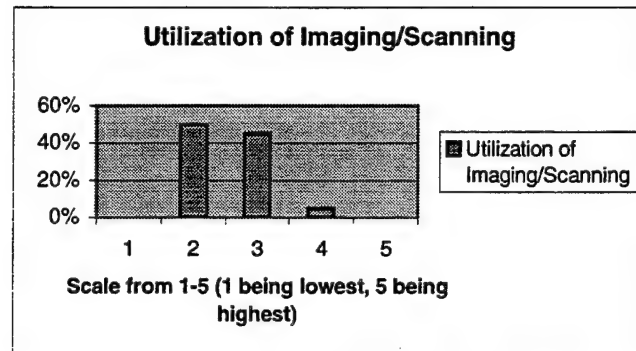
**Figure 2. Utilization of Imaging/Scanning**

Figure 2 shows 50 percent of the CIOs utilize imaging/scanning technology, is in the lower level of the scale (the value of 2), while 5 percent utilize the technology, is in the upper level of the scale (the value of 4).

**Utilization of Internet**

Scale from 1-5 (1 being lowest, 5 being highest)
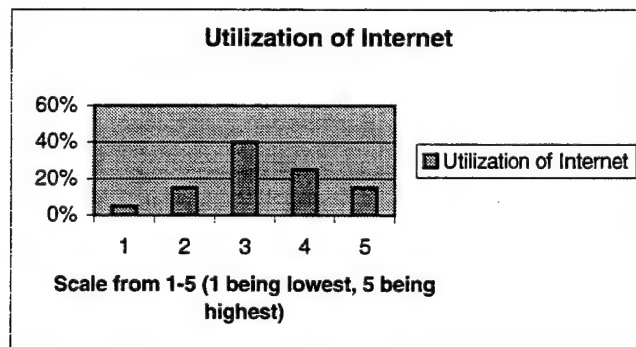
**Figure 3. Utilization of Internet**

Figure 3 shows that 25 percent of the CIOs utilize internet technology, is in the upper level of the scale (the value of 4). Only 5 percent utilize internet technology, is in the lower level of the scale (the value of 1). The majority (40%) shows that CIOs utilize the internet, is in the middle level of the scale (the value of 3).

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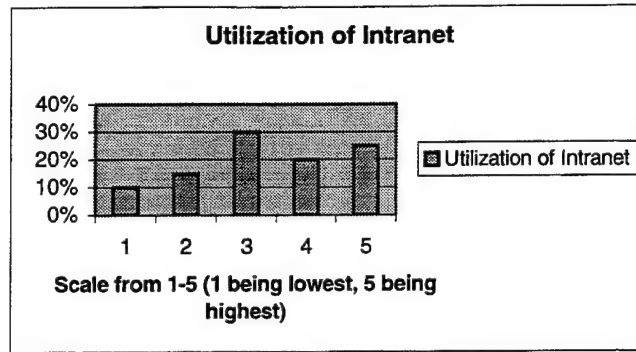
**Figure 4. Utilization of Intranet**

Figure 4 shows 20 percent of CIOs report the utilization of an intranet on the scale

of 4. Twenty-five percent report utilizing intranets on a scale of 5. The majority (30%)

of the CIOs utilize intranets on the scale of 3.
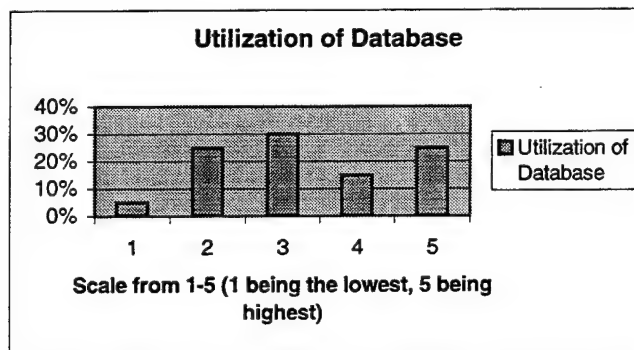


**Figure 5. Utilization of Database**

Figure 5 reveals 15 percent of the CIOs utilize a database, is in the upper level of

the scale (the value of 4) and 25 percent use databases, is in the upper level of the scale

(the value of 5). However, 5 percent utilize database technology, is in the lower level of

the scale (the value of 1).
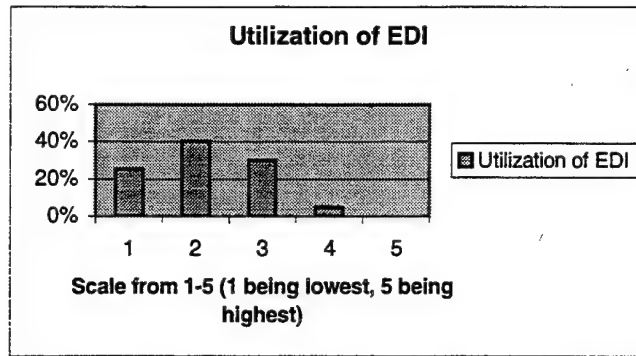
**Figure 6. Utilization of EDI**

Figure 6 shows 25 percent of CIOs utilize EDI technology, is in the lower level of the scale (the value of 1) and 40 percent utilize EDI, is in the lower level of the scale (the value of 2). Only 5 percent of the CIOs report utilizing EDI, is in the upper level of the scale (the value of 4).
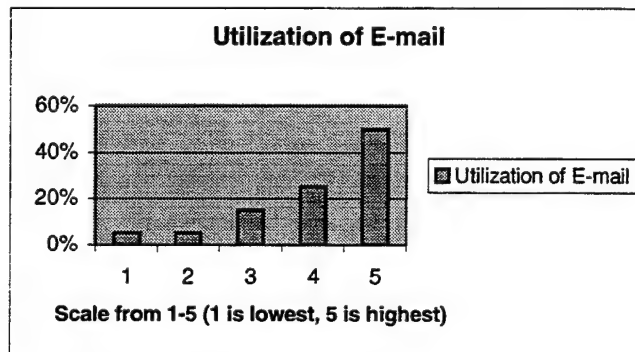


**Figure 7. Utilization of E-mail**

Figure 7 reveals 50 percent of the CIOs utilize e-mail technology, is in the upper level of the scale (the value of 5).
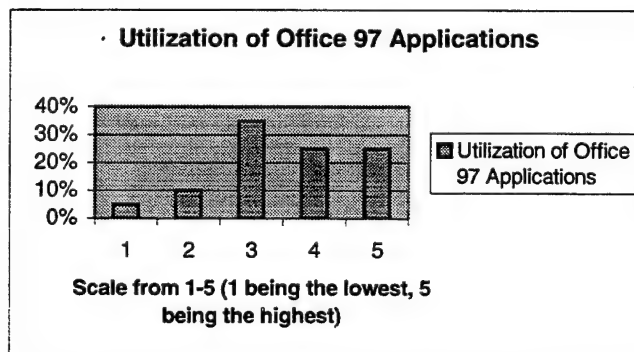


**Figure 8. Utilization of Office 97 Applications**

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Figure 8 shows 25 percent of the CIOs utilize Office 97 Applications, is in the upper level of the scale (the value of 4) and 25 percent utilize Office 97 Applications, is in the upper level of the scale (the value of 5).
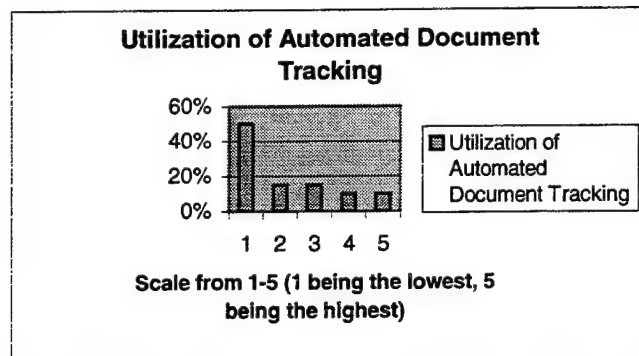


**Figure 9. Utilization of Automated Document Tracking**

Figure 9 shows 50 percent of the CIOs utilize Automated Document Tracking technology, is in the lower level of the scale (the value of 1). Only 10 percent of the CIOs report utilizing Automated Document Tracking technology, is in the upper level of the scale (the value of 4) and 10 percent, is in the upper level of the scale (the value of 5).

## 5. Greatest Achievements

The CIOs were asked to provide their greatest achievement in creating a paper-less office. The responses were grouped into seven categories: servers, internet/intranet, management, not applicable (no achievements to report), standardization of hardware/software, education of staff, and database. Figure 10 shows the CIOs greatest achievements.

**CIO's Greatest Achievements**
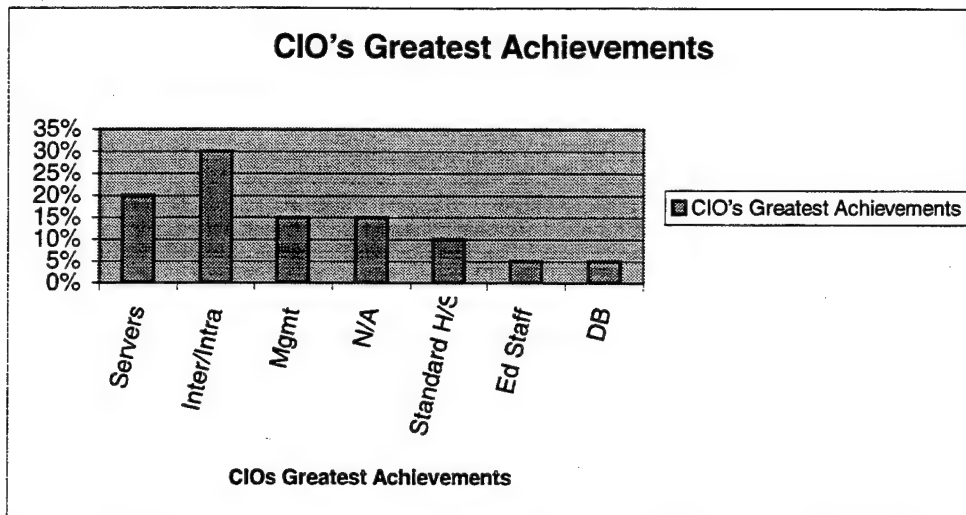


Figure 10. Findings From Paper-less Office Survey

Figure 10 reveals the majority of CIO's greatest achievements are in internet/intranet technologies. U.S. Naval Hospital Guam and Naval Hospital Corpus Christi consider their greatest achievement is the installation of a fax server. The fax server is used to centralize all faxing services in the command while controlling both internal and external information. The fax server also reduces the need for modems and other devices within the command.

Naval Hospital Guantanamo Bay created and implemented a command intranet. Now all instructions, watchbills, conference room schedules, ferry schedules, directories, and menus are available via the intranet. Naval Hospital Jacksonville is using an intranet to produce electronic DD1149s for ordering materials and tracking departmental OPTARs.

Successful planning and acceptance of a migration to MS Outlook 98 and MS Exchange 5.5 Suite coupled with three year leasing of MHS standard PCs has been the greatest achievement for Naval Hospital Groton. Naval Hospital Pensacola also considers management techniques as their greatest achievement by assessing the overall

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infrastructure and implementing a coherent plan to provide a good, solid baseline infrastructure.

The N/A category is defined as those facilities that did not respond to the question. Naval Hospital Charleston's greatest achievement is the standardization of software and properly configured computers. While Naval Hospital Sigonella has standardized email and application software which has reduced the necessity for hard copy documents.

Naval Hospital Great Lakes state their greatest achievement is education. By educating the end users of the benefits of the paperless office the command will save time, paper, and costs.

Naval Hospital 29 Palms has created multiple database applications for various departments including a Surgical Scheduling/Interqual Criteria documenting application. The creation of this database is considered their greatest achievement.

## B. ANALYSIS

### 1. Independent Variables and Scales

This section examines the independent variables and shows how the scales were created from the independent items. Two procedures were used in the creation of scales:

1) Factor Analysis

2) Correlation Matrix

Table 38 reveals how the survey was formed using three independent variables (resources, leadership, technology) consisting of 44 items and one dependent variable consisting of 9 items.

| Independent Variables | Items |
|---|---|
| **Resources** | |
| Time | 1, 2 |
| Money | 3, 4, 5 |
| Staff | 6, 7, 8 |
| Staff Involvement | 9, 10, 11 |
| **Leadership** | |
| CIO Experience/Training | 12a-l, 13 |
| CIO Communication | 14, 15, 16 |
| Salience | 17, 18, 19a |
| CIO Participation | 19b, 19c |
| **Technology** | |
| Information Technology | 19d-h, 20, 21a-b |
| **Dependent Variables** | 22a-l |

Table 38. Variables

## 2. Factor Analysis

In order to test the validity of these items we then chose to use factor analysis. "Validity involves the degree to which you are measuring what you are supposed to, more simply, the accuracy of your measurement" (http://trochim.human.cornell.edu).

Factor analysis is a statistical approach that can be used to analyze interrelationships among a large number of items and to explain these items in terms of their common underlying dimensions (factors). This statistical approach is a way of condensing the information contained in a number of original items into a smaller set of dimensions (factors) with a minimum loss of information (Hair et al., 1992).

There are 5 general rules when conducting a factor analysis:

**General Rule #1:** There should be at least three items to make up a factor.

**General Rule #2:** Factor analysis requires interval or ratio level measurement.

**General Rule #3:** Avoid the use of exploratory factor analysis.

**General Rule #4:** Have 10 subjects for each item included in your factor analysis or a minimum of 300 subjects. (Some authors claim factor analysis on less than 1,000 subjects is instable and meaningless but they tend to be responding to studies with incoherent sampling designs.)

**General Rule #5:** If the average (some say minimum) correlation is NOT over .30 (some say .40), then conducting factor analysis on the data may not be fruitful. (http://www.regent.edu/acad/schcom/phd/703/factor.html).

We acknowledge that the paper-less office survey did not meet all the general rules for running a factor analysis, specifically, general rule numbers 1, 4, and 5. However, the use of factor analysis, while an improper procedure for this analysis, was useful as a learning tool. Therefore, in order to gain insight on the process of factor analysis, the procedure was employed in this research.

A rotated principle component factor procedure was used on all independent items without specifying the number of factors to be extracted. The result was a solution of eleven factors that exhibited eigenvalues greater than 1.0. The solution explained 89.555 percent of the covariance among the items. Items were dropped from further analysis if their factor loadings were less than 0.4 or if they loaded on two factors with loadings greater than 0.4. Thirty-nine out of 53 items were dropped based on these criteria. The final 14 items, three-factor model is reported in Table 38.

In addition to the original independent items, scales were created based on the factor structure. This section examines the reliability of the scales created from the factor analysis. "Reliability estimates the consistency of your measurement, or more simply the

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degree to which an instrument measures the same way each time it is used in under the

same conditions with the same subjects"

(http://trochim.human.cornell.edu/tutorial/colosi/lcolosi2.htm).

| Size (Cronbach's Alpha = .7058) | Loading |
|---|---|
| S1:  Size MTF | 0.838 |
| S2:  Staff assigned to MID | 0.780 |
| S3:  Permanent staff assigned to MID | 0.850 |
| S4:  Additional staff needed in MID | 0.444 |
|  |  |
| Resources (Cronbach's Alpha = .8932) |  |
| R1:  Hours per day spent on planning | 0.918 |
| R2:  Hours per week work with upper management | 0.681 |
| R3:  Hours per day  work with command staff | 0.816 |
| R4:  Hours per day  implementing | 0.916 |
| R5:  Percent of IS budget actually spent | 0.815 |
| R6:  Percent of IS budget spent on department training | 0.859 |
|  |  |
| Planning (Cronbach's Alpha = .7842) |  |
| P1:  Staff involved in planning | 0.754 |
| P2:  PLO included ADP | 0.884 |
| P3:  ADP in SP | 0.823 |
| P4:  Years experience in Office Applications 97 | 0.819 |

**Table 39.  Results of Factor Analysis**

As shown in Table 39, the first factor (eigenvalue = 7.557) was labeled size and

accounted for 17.573 percent of the covariance.  The four items defining this factor, with

loadings ranging from 0.850 to 0.444, relate to the size of the Management Information

Department. The internal consistency reliability coefficient for the size factor is 0.7058.

The second factor (eigenvalue = 6.278) was labeled resource and accounted for

14.600 percent of the covariance.  The six items defining this factor, with loadings

ranging from 0.918 to 0.681, represent time, money and planning. The internal

consistency reliability coefficient for the resource factor is 0.8932.

The third factor (eigenvalue = 5.060) was labeled planning and accounted for

11.767 percent of the covariance.  The four items defining this factor, with loadings

ranging from 0.884 to 0.754, relate to planning of the paper-less office. The internal consistency reliability coefficient for the experience factor is 0.7842.

Cronbach's Alpha was used to examine the reliability of the variables. Table 40 shows the results of the Cronbach's Alpha for the scales created from the Factor Analysis.

| Reliability Coefficients | | | |
|---|---|---|---|
| Scales From Factor Analysis | N of Cases | N of Items | Alpha |
| Size | 20 | 4 | 0.7058 |
| Resources | 20 | 6 | 0.8932 |
| Planning | 20 | 4 | 0.7842 |

**Table 40. Cronbach's Alpha for Scales from FA**

## 3. Correlation Matrix

In order to obtain more than three scales for analysis, the correlation matrix was used to extract additional independent variables. The independent items were then grouped together to create more scales for analysis. Table 41 shows the Cronbach's Alpha for the scales created from the correlation matrix.

| Reliability Coefficients | | | |
|---|---|---|---|
| Scales From Correlation | N of Cases | N of Items | Alpha |
| Time | 20 | 2 | 0.9147 |
| Staff | 20 | 3 | 0.7563 |
| Staff Involvement | 20 | 3 | 0.7563 |
| CIO Experience/Training | 20 | 13 | 0.8254 |

**Table 41. Cronbach's Alpha for Scales from Correlation**

## 4. Summary

In summary, there are a total of 12 scales that were created from either the factor analysis or from the correlation matrix. Table 42 shows the scales created and the items used on independent varabiles.

| Scale Created From Factor Analysis | Scale Created From Correlation Matrix | Single Items |
|---|---|---|
| Size | Time | Money |
| Resource | Staff | Salience |
| Planning | Staff Involvement | CIO Participation |
| | CIO Exp/Training | Reuse |
| | | User Friendly |

Table 42. Summary of Scales

The correlation matrix for the independent items and scales created from the factor analysis and correlation matrix is found in Appendix C and D.

## C. DEPENDENT VARIABLE

Summing the nine dependent items for each facility created the dependent variable. Table 43 shows the results of the summation. The dependent items were based on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest. Therefore, the nine questions multiplied by the highest rating on the Lickert scale (5), give a maximum total summation of 45 for the scale.

| Scale | Site Summation |
|---|---|
| 45 | |
| 44 | |
| 43 | |
| 42 | |
| 41 | |
| 40 | |
| 39 | Naples |
| 38 | |
| 37 | |
| 36 | |
| 35 | |
| 34 | Bethesda |
| 33 | Okinawa |
| 32 | Portsmouth VA |
| 31 | 29Palms |
| 30 | Sigonella, San Diego |
| 29 | Bremerton, Jacksonville, Gitmo |
| 28 | Beaufort |

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| | |
|---|---|
| 27 | |
| 26 | Rota |
| 25 | LeMoore, Charleston |
| 24 | |
| 23 | Groton |
| 22 | Keflavik |
| 21 | Great Lakes |
| 20 | Pensacola |
| 19 | |
| 18 | Corpus |
| 17 | |
| 16 | |
| 15 | |
| 14 | Guam |
| 13 | |
| 12 | |
| 11 | |
| 10 | |
| 9 | |
| 8 | |
| 7 | |
| 6 | |
| 5 | |
| 4 | |
| 3 | |
| 2 | |
| 1 | |
| 0 | |

**Table 43. Summation of Dependent Measure**

As shown in Table 43, the dependent variable did not provide the variation that was expected. Although the variation was not as great as we would like to have seen, we decided to continue the data analysis with what we have.

Most of the MTFs were grouped in the middle of the scale. Only two of the MTFs fell away from the group, Naples with a sum of 39, and Guam with a sum of 14. Therefore, this last section will compare the dependent measure data provided by the two MTFs (Naples and Guam) that fell out of the group.

| Dependent Measure | Naples | Guam |
|---|---|---|
| Workflow Mgmt | 4 | 1 |
| Imaging/Scanning | 3 | 2 |
| Internet | 5 | 1 |
| Intranet | 5 | 3 |
| Database | 5 | 1 |
| EDI | 2 | 1 |
| E-mail | 5 | 2 |
| Office 97 Applications | 5 | 2 |
| ADT | 5 | 1 |
| Summation | 39 | 14 |

Table 44. Summation of Dependent Measure (Naples & Guam)

Table 44 shows a comparison of the dependent measure data provided by Naples and Guam. As shown in Table 44, on a Lickert scale from 1-5 with 1 being the lowest, 5 being the highest, Naples, in comparison to Guam, uses technology to a greater extent towards creating a paper-less office. For example, Naples uses the intenet on a scale of 5, compared to Guam, on a scale of 1. Workflow management is used to a greater extent in Naples (on a scale of 4) as compared to Guam (on a scale of 1). Naples also uses Office 97 Applications on a scale of 5, where Guam is on a scale of 2. This data is congruent to Naples reputation as an MTF that is ahead of most MTFs in technology usage.

## D. TEST OF HYPOTHESIS

After creating the scales we ran Pearson's Correlations among the independent and dependent variables. Using a .05 and .01 significance level, we found no significant intercorrelations among the scales, items, or dependent variable as shown in Appendix C and D.

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# E. SUMMARY

The results of the analysis reveal no support for the hypotheses.

# V. DISCUSSION

## A. INTRODUCTION

As evidenced through the data analysis in the previous chapter, the hypotheses were not supported. This chapter, therefore, will attempt to account for the lack of relationships between the independent and dependent variables.

Section II below reviews the methodological problems with the survey and section III examines the substantive issues for each hypothesis.

## B. METHODOLOGICAL PROBLEMS

There are three serious methodological issues: questions about the dependent variable; sample size; and scaling. It is likely that all three issues contributed to the lack of support for the hypothesis.

### 1. Dependent Variable

#### a. Definition of Dependent Variable

A paper-less office is defined in this thesis as: "an environment where the transmission, storage, and retrieval of information is not completed through the medium of paper; it is completed through electronic data networks" (Hicks, 1997, p. 1). While the definition appears to be standard in the literature, the way in which the definition has been conceptualized and operationalized in this research may be problematic.

### b. Conceptualization

Our conceptualization of a paper-less office was based on technology, meaning the emphasis was limited to the hardware and software of the technology. Other organizational elements required to support the technological hardware and software were not researched. By measuring a paper-less office purely in technological terms, we did not capture other dimensions such as the human component that is also important. Hardware and software, at this point in time, require programming, maintenance, and set-up performed by human resources. Without factoring in the individuals who do the work, the paper-less office may not be realized.

### c. Operationalization

Nine items based on information technology operationalized the dependent variable. However, as evidenced in the literature review, not one organization has introduced all nine elements of a paper-less office. For example, a mutual fund industry leader (company name not disclosed) considers their company paper-less due to the implementation of workflow management and imaging systems (http://www.imcinc.com, no date). The Mutual Fund Industry Leader first introduced workflow management and then imagining systems followed. Thus, in this company (which manages 15,000 to 20,000 documents daily), only two out of the nine elements were completed. This finding suggests there may be different routes to a paper-less office. As shown in the literature review, Wal-Mart considers EDI as their paper-less office technology, where Target considers utilizing automated forms and reports as their paper-less office technology.

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Therefore, it is possible that organizations may have a paper-less office without all nine elements being present.

## 2. Sample Size

The sample size targeted by the survey was small (28), and only 20 organizations responded, thus limiting the type of analysis that could be conducted. We speculate that the CIOs' response rate was lower than expected because they were too busy with the day-to-day operations to answer the survey. We also have indications that this group is part of an over surveyed population which receives surveys on a regular basis.

The small sample also provided little variation, restricting the analysis. In an attempt to compensate for this lack of variance, the dependent variable was broken down into three categories, high, medium, and low (see Table 45).

| Scale Name | High | Medium | Low |
|------------|------|--------|-----|
| Sample Size | N=5 | N=14 | N=1 |
| Range | 45-31 | 30-16 | 15-0 |

Table 45. Dependent Variable Categories

An analysis of variance (ANOVA) was performed in order to determine whether there were significant differences in the means between groups or across different conditions. However, the results (using significance level of .10 and .05) still indicated no statistical significant differences in means among the items or scales.

## 3. Scaling

The scale for the dependent items were based on a Lickert scale from 1-5 with 1 being the lowest, and 5 being the highest. However, since the scale was not anchored with text, some MTF CIOs may have interpreted the Lickert scale differently. For example, the value number 1 may have been interpreted to mean "some extent" by one

CIO and interpreted to mean "no extent" by another CIO. Therefore, this potential misinterpretation of the scale may account for the lack of support.

## C. EXPLORATION OF HYPOTHESES

We have explored methodological issues in the previous section, now we turn to more substantive issues in this section.

**H1:** **The greater amount of time in organizing and implementing a paper-less office, the higher the probability of success in creating a paper-less office.**

We know from the literature review that time is important in developing a paper-less office (Norling, 1996). The data reveal the average amount of time CIOs spend in organizing and implementing a paper-less office is 4.10 hours per day for organizations which have made the greatest progress towards a paper-less office, 3.34 hours per day for those in the midrange, and 1.01 hours per day for organizations which have made the least progress. These results suggest a linear relationship, although the relationship does not reach significance. It is likely that the lack of variance on the independent variable "time" accounts for this result, since organizational responses tended to cluster at the midrange with few organizations in the lower and upper ranges.

**H2:** **The greater amount of money allocated towards a paper-less office, the higher the probability of success in creating a paper-less office.**

As evidenced in the literature review, money is a critical element in the creation of a paper-less office (Kalin, 1998). The data reveal the average amount of money allocated towards a paper-less office is $101,000 to 200,000 for organizations which have made the greatest progress towards a paper-less office, $301,000 to 400,000 for those in the

midrange, and $101,000 to 200,000 for organizations which have made the least progress. This distribution suggests a curvilinear relationship. Based on this observation, it is possible that resource allocation follows a lifecycle process so that the allocation of money depends on the phase of the project. The planning phase may require little money, compared to the interim phase which is marked by costly employee training, and acquisition of the technology. Funding then may taper off as an organization approaches the goal of a paper-less office.

> **H3: The more staff assigned to work office automation activities, the higher the probability of success in creating a paper-less office.**

> **H3a: The more permanent staff assigned to work office automation activities, the higher the probability of success in creating a paper-less office.**

We know through the literature review that staff members play an important role in the creation of a paper-less office. (Kerzner, 1998). However, the data reveal the average amount of staff members assigned to work office automation activities is 50.60 (staff/permanent staff members) for organizations which have made the greatest progress towards a paper-less office, 46.36 (staff/permanent staff members) for those in the midrange, and 44.00 (staff/permanent staff members) for organizations which have made the least progress. The lack of support for these hypotheses suggests that it may be the quality of staff rather than the quantity of staff that moves an organization towards a paper-less office. For example, Chapter IV reveals Naples (an organization which has made the greatest progress towards a paper-less office) MID department is comprised of 31 staff/permanent staff members and is moving towards a paper-less office at a faster rate than Guam (an organization which has made the least progress) whose MID department is comprised of 49 staff/permanent staff members. Therefore, it is likely that

Naples employs a more experienced and trained staff than Guam. To explore this possibility, we examine the hypothesis H5:

**H5: The greater the CIO experience and training with a paper-less office, the higher the probability of success in creating a paper-less office.**

Education, training, and experience are essential for a CIO as noted in the literature review. This pattern is supported in our data. The data reveal the average CIO experience and training with paper-less office technology for Naples is 4.24 years (an organization which has made the greatest progress towards a paper-less office) and 2.45 years for Guam (an organization which has made the least progress). The data also reveal the average amount of CIO experience and training with paper-less office technology is 5.49 years for organizations which have made the greatest progress towards a paper-less office, 5.15 years for those in the midrange, and 2.45 years for organizations which have made the least progress. Hence, there is some support to our speculation for H3 and H3a above that having staff with more experience and training is valuable in moving an organization towards a paper-less office.

We also note that, although the relationship in H5 is the expected direction, the lack of significance may be due to the reduced variance on the independent variable (the values clustered at the midrange on the independent variable "CIO experience and training").

**H4: The greater the staff involvement in planning, implementing, and evaluating a paper-less office, the higher the probability of success in creating a paper-less office.**

Staff involvement is an important aspect of creating a paper-less office as noted in the literature review. This pattern is supported in our data, although the relationship is not significant. The average amount of staff involved in planning, implementing, and

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evaluating a paper-less office is 11.00 staff members for organizations which have made the greatest progress towards a paper-less office, 10.07 staff members for those in the midrange, and 7.00 staff members for organizations which have made the least progress. Again, the lack of variance on the independent variable (the values clustered at the midrange on the independent variable "staff involvement") may account for the lack of significance.

**H6: The greater the CIO's participation in setting the organization's goals, the higher the probability of success in creating a paper-less office.**

We know through the literature review that implementation of information systems without the CIO's participation is unlikely. However, in this sample CIO participation in goal setting is not correlated with creation of a paper-less office. In fact, the relationship between CIO goal setting and paper-less office appears to be curvilinear. For example, when breaking the MTFs into 3 categories, the value of those organizations in the lowest category (MTFs which have had the least progress in moving toward a paper-less office) have the highest level (4.00) of CIO participation in goal setting. Those MTFs in the midrange (MTFs which have a moderate degree of progress in moving toward a paper-less office) have the lowest level (3.29) of CIO participation in goal setting. Those MTFs in the highest range (MTFs which have the highest degree of progress in moving toward a paper-less office) have a midlevel (3.60) of CIO participation in goal setting.

Based on the data, it appears that the phase of the project may determine the amount of CIO participation in strategic planning. For example, CIO participation is required more for those organizations in the initial strategic planning phase of the project than in the interim phase (which is marked by monitoring the progress of the project).

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When the project enters the implementation phase, CIO participation is once again required in order to seamlessly deploy and implement the paper-less office according to the organizational strategic plans.

**H7:  The greater amount of salience in the organization, the higher the probability of success in creating a paper-less office.**

We know through personal experience that by making a program/project salient throughout the command one can ensure a higher probability in having a successful program/project.  The data reveal the average level of CO support, for organizations which have made the greatest progress towards a paper-less office (based on a Lickert scale from 1-5, 1 being the lowest and 5 being the highest), is in the upper level of the scale (the value of 4.20).  For those organizations in the midrange, the average is in the middle to upper level of the scale (the value of 3.50), and for those organizations which have made the least progress, the average is in the lower level of the scale (the value of 2.00).  These results suggest a linear relationship, although the relationship does not reach significance.  Therefore, it is likely that the lack of variance on the independent variable "salience" accounts for this result, since organizational responses tended to cluster at the midrange with few organizations in the lower and upper ranges.

**H8:  The greater the CIO's communication with CIO peers outside the command, the higher the probability of success in creating a paper-less office.**

CIO's communication with CIO peers outside the command is an important aspect of creating a paper-less office as noted in the literature review, however, this finding is not supported in our sample.  The data reveal the average amount of CIO communication with CIO peers is 29.00 (send/receive less than ten e-mail/phone calls per day) for organizations which have made the greatest progress towards a paper-less office,

28.28 (send/receive less than ten e-mail/phone calls per day) for those in the midrange, and 28.00 (send/receive less than ten e-mail/phone calls per day) for organizations which have made the least progress. Thus, it appears that CIOs communicate externally with their peers regardless of the project and the progress they make on a paper-less office.

**H9: The greater the utilization of Information technology already in place, the higher the probability of success in creating a paper-less office.**

As evidenced through the literature review, the utilization of technology already in place is necessary in the creation of a paper-less office. The data reveal the average level of information technology reused annually for organizations which have made the greatest progress towards a paper-less office (based on a Lickert scale from 1-5, 1 being the lowest and 5 being the highest), is in the upper level of the scale (the value of 4.00). For those organizations in the midrange, the average is in the middle to upper level of the scale (the value of 3.64), and for organizations which have made the least progress, the average is in the middle level of the scale (the value of 3.00). These results suggest a linear relationship, although the relationship does not reach significance. Again, the lack of variance on the independent variable (the values clustered at the midrange on the independent variable "reuse") may account for the lack of significance.

**H10: The more user friendly the Information technology, the higher the probability of success in creating a paper-less office in creating a paper-less office.**

We know through the literature review that computers are more effective when the technology is "simple" for the user (Gross and Lohman, 1997). However, the sample data reveal the average level in which information technology is easy to install, configure, and use in creating a paper-less office for organizations which have made the greatest progress towards a paper-less office (based on a Lickert scale from 1-5, 1 being the

lowest and 5 being the highest), is in the middle to upper level of the scale (the value of 3.80). For those organizations in the midrange, the average is in the middle to lower level of the scale (the value of 2.92), and for those organizations which have made the least progress, the average is in the middle level of the scale (the value of 3.00). This distribution suggests a curvilinear relationship. It is possible that technology appears to be user friendly only after the staff members have been fully trained and have obtained day-to-day experience on the technology. For example, an MTF moving towards a paper-less office will find their information technology less user friendly than a command that has already made considerable progress toward implementation. This is a function of the learning curve. Staff members must learn how to use the technology before they can state whether the technology is user friendly or not.

## D. SUMMARY

The methodological problems and the substantive issues addressed in this analysis suggest some reasons why the hypotheses may not have been supported. Problems with the dependent variable (conceptualization and operationalization), the sample size, and the scaling of the dependent measurement all could have been factors.

Although the hypotheses were not supported, some interesting substantive issues were discovered. We speculate that money allocation may follow a lifecycle process in the creation of a paper-less office. For example, the allocation of money depends on the phase of the project. The planning phase may require little money, compared to the interim phase, which is marked by costly employee training, and acquisition of the technology. Funding then may taper off as an organization approaches the goal of a

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paper-less office. Therefore, it appears that money allocation may be dependent on the lifecycle of the project.

Based on the data analysis and our professional experience, it appears that CIO participation is determined by the phase of the project. For instance, in the initial strategic planning phase of a project, the CIO must participate more in the strategic planning of the project in order to provide/receive direction needed to meet the organizational goals. As the project moves into the interim phase, the CIO's role is one of monitoring and reassessing the progress of the project. The interim phase may also involve more of the end users participation than the CIOs. Therefore, the CIO's participation is reduced. When the project moves into the implementation phase of the project, the CIO must participate more in order to implement the project in accordance to the organizational goals.

Staff may follow a quality versus quantity argument. For example, an MTF staffed with very knowledgeable, experienced, and trained personnel may not require as many staff members as another MTF staffed with inexperienced and untrained personnel. Therefore, it is likely that the quality of staff members is more valuable in creating a paper-less office than the quantity of staff members.

Another interesting substantive issue discovered in this analysis is the relationship between information technology and the learning curve. The learning curve is steep when new technology is introduced into an organization. As staff members become more trained and knowledgeable in the technology, the learning curve flattens out and the technology becomes user friendly to the staff members. Therefore, it appears that technology becomes user friendly only after learning has occurred.

This analysis has focused mainly on internal organizational issues, however we speculate that there may be external factors (i.e., geographic location, products, vendors, etc.) that are preventing the movement towards a paper-less office. However, the data gathered in this analysis does not examine external factors. Therefore, external factors need to be addressed and researched further.

As mentioned earlier, the hypotheses were not supported, however, the substantive issues discovered are interesting and provide insight into the creation of a paper-less office.

# VI. CONCLUSIONS

## A. INTRODUCTION

The underlying reason for pursing this thesis was to gain insight into what Naval MTF CIOs are doing with technology to move their commands towards a paper-less office. Given the methodological problems encountered in this study, it is difficult to make definitive statements about the topic. However, there are several substantive issues that provide interesting insight into the creation of a paper-less office.

## B. RESEARCH QUESTIONS ANSWERED

### 1. What is the Naval Medical Community (i.e., MTFs, Clinics) doing to move towards a paper-less office?

As evidenced in the data analysis, the Naval Medical Community is utilizing several of the nine elements to move towards a paper-less office. As shown in Chapter IV, the majority of the MTFs are using e-mail and Office 97 applications towards creating a paper-less office. The analysis also shows, on average, the MTF CIOs greatest achievement is in the utilization of the internet/intranet technology.

We also know from this analysis that the MTFs CIO is allocated, on average, $201,000 to 300,000 dollars in their IS budget and on average, less than 20% of the allocated budget is spent on creating a paper-less office.

MTF CIOs are spending an average of 1.61 hours per day planning the creation of a paper-less office. They are also spending an average of 1.67 hours per week working with upper management and 1.19 hours per day working with command staff.

We know from this analysis, that the Naval Medical Community, on average, has moderate CO support for the creation of a paper-less office in the MTFs. We have also found, as evidenced in Chapter IV, that the CIOs exhibits moderate participation in setting the organizations goals.

We know, as evidenced in Chapter IV, on average, the MTFs CIOs are reusing their information technology.

### 2. What is associated with the movement towards a paper-less office?

In contrast to what the literature reveals, resources, leadership, etc., we found no significant intercorrelations among the scales, items, or dependent variables as shown in Appendix C & D using a .05 and .01 significance level. Therefore, we found no support for the hypotheses. As we speculated in Chapter V, lack of significant correlations may be due to the external environment of the MTFs which we judge to be turbulant and prone to change at this time. It is likely under these circumstances that external variables overshadow what goes on internally and are more significant in the movement towards a paper-less office.

## C. RECOMMENDATIONS FOR FUTURE RESEARCH

The information obtained from the literature review and the insight gained from the data analysis lead to several recommendations for future research.

- Re-conceptualize the paper-less office concept and include the human factor. For example, include studies on the human aspect of a paper-less office along with the technological.

- Replicate the study on a larger sample size.  For example, use the entire DOD MTF population.

- Research the effect external influences have on the creation of a paper-less office in the Naval Medical Community.  For example, there may be many external influences (i.e., geographic location, products, vendors, etc.) that may be preventing the movement towards a paper-less office.

- Examine the impact of the level in the hierarchy on the information management function and the consequences of misplacement?  For example, what are the effects of placing the CIO higher up in the hierarchy of the organization? In contrast, what is the effect of placing the CIO lower in the hierarchy?

# APPENDIX A. PAPER-LESS OFFICE SURVEY

**The purpose of this survey is to see what extent Naval Medical Treatment Facilities (MTFs) are creating a paper-less office. Your assistance in completing and submitting the survey no later than 30 November 1998 is appreciated. Thank you for your time.**

**Directions:** To answer the following questions, please click on the radio buttons or type in the appropriate response.

## DEMOGRAPHICS

DI. What is the name of your facility?

_____

D2. What is the size of your facility?

   0-50 beds
   51-100 beds
   101-150 beds
   151-200 beds
   200 +beds

D3. Does your medical treatment facility (MTF) have any clinics for which it is responsible?

       Yes    No

## PAPER-LESS OFFICE SURVEY

**Paper-less Office** is defined as "an environment where the transmission, storage, and retrieval of information is not completed through the medium of paper; it is completed through electronic data networks."

1. How many hours a day do you spend planning activities that support/promote a paperless office?
hours

       _____ hours

2. How many hours a day do you spend implementing activities that support/promote a paper-less office? (Implementation is defined as taking actions to execute your plans.)

       _____ hours

3. On average, how much money is allocated annually to your IS budget?

    Less than $ 100,000
    $101,000 to 200,000
    $201,000 to 300,000
    $301,000 to 400,000
    $401,000 to 500,000
    $501,000+

4. On average, what percent of your annual IS budget is actually spent on creating a paperless office?

    Less than 20%
    21-40%
    41-60%
    61-80%
    81-100%

5. What percent of the department training budget is spent on continuing education in technology processes? (Technology processes are defined as hardware and software utilized in the automation of office activities.)

    Less than 20%
    21-40%
    41-60%
    61-80%
    81-100%

6. How many staff members do you have assigned to the Management Information Department (MID)? (Staff is defined as the number of full-time, part-time, contract, and temporary personnel assigned to MID.)

    _____ staff members

7. How many permanent staff members do you have assigned to MID? (Permanent staff is defined as fill-time and part-time employees working in MID.)

    _____ permanent staff members

8. In your opinion, how many additional staff members are needed in MID to create a paper-less office?

    _____ additional staff members

9. How many of your staff members are involved in planning a paper-less office?

_____ staff members

10. How many of your staff members are involved in implementing a paper-less office? (Implementation is defined as taking actions to execute the plan.)

_____ staff members

11. How many staff members are involved in evaluating the organization's progress in creating a paper-less office? (Evaluation is defined as assessing the extent to which your planning goals have been achieved.)

_____ staff members

12. The following categories contain types of experience/training in office automation activities. Please fill in the number of years you have had in the following areas:

Type of Experience/Training ---------- Years of Experience

Workflow Management _____
Scanning Equipment _____
Imaging Equipment _____
Internet _____
Intranet _____
Network _____
Database _____
Electronic Data Interchange (EDI) _____
E-mail _____
Office 97 _____
Automated Document Tracking _____
Other: (Please write in here) _____

13. How many years have you been a CIO?

_____ years

14. How much e-mail do you receive/send on a daily basis with other CIOs?

Less than 10
11-20
21-30
31-40
41-50
51+

15. How many telephone calls do you receive/make on a daily basis with other CIOs?

       Less than 10
       11-20
       21-30
       31-40
       41-50
       51+

16. How many conferences related to technology processes do you attend annually?

       1-2
       3-4
       5-6
       7-8
       9-10
       10+

17. How many hours per week do you spend working with upper management on creating a paper-less office?

     _____ hours per week

18. How many hours per day do you spend working with command staff (i.e., contractors, full-time, part-time, civilian, military, and temporary personnel) on creating a paper-less office?

     _____ hours per day

19. Please check one number for each of the following questions with 5 being the highest and 1 being the lowest.

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| To what extent does the CO support the paper-less office concept? |  |  |  |  |  |
| To what extent does the paper-less office fit in your departmental priority scheme? |  |  |  |  |  |
| To what extent do you participate in the command's strategic planning? |  |  |  |  |  |
| To what extent is your information technology easy to install/configure? (Information technology is defined as a set of interrelated components that collect, process, store, and distribute information to support decision making and control in an organization.) |  |  |  |  |  |

| | | | | | |
|---|---|---|---|---|---|
| To what extent is your information technology easy to integrate with other systems? | | | | | |
| To what extent is your information technology reused on an annual basis? | | | | | |
| To what extent is your information technology disposed on an annual basis? | | | | | |
| To what extent do you purchase information technology on an annual basis? | | | | | |

20. Does the command have an ADP Plan? (An ADP Plan is defined as a long-term plan that contains hardware/software needed in support of the command's information technology.)

   Yes (If Yes, go to question 2 1)
   No (If No, go to question 22)

21. Please check one number for each of the following questions with 5 being the highest and 1 being the lowest.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| To what extent is paper-less office included in the ADP Plan? | | | | | |
| To what extent is the ADP Plan incorporated into the command's strategic plan? | | | | | |

22. Please check one number for each of the following questions with 5 being the highest and 1 being the lowest.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| To what extent is workflow management used in your command to create a paper-less office? | | | | | |
| To what extent is imaging/scanning equipment used in your command to create a paper-less office? | | | | | |
| To what extent is the internet used in your command to create a paper-less office? | | | | | |
| To what extent is the intranet used in your command to create a paper-less office? | | | | | |
| To what extent are databases used in your command to create a paper-less office? | | | | | |
| To what extent is EDI used in your command to create a paper-less office? | | | | | |
| To what extent is e-mail used in your command to create a paper-less office? | | | | | |
| To what extent is Office 97 applications used in your command to create a paper-less office? | | | | | |

| To what extent is automated document tracking used in your command to create a paper-less office? | | | | | |
|---|---|---|---|---|---|

23. What do you consider your greatest achievement in creating a paper-less office? Please write in your responses here.

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Thank you for taking the time to complete this survey. Select Submit Survey now to send your responses to us.

| Submit Survey | Clear All Answers |
|---|---|

# APPENDIX B. QUESTION RESPONSE CODING MARTIX

| Question Responses | Code |
|---|---|
| Yes | 1 |
| No | 2 |
| Less than $100,000 | 3 |
| $101,000 to 200,000 | 4 |
| $201,000 to 300,000 | 5 |
| $301,000 to 400,000 | 6 |
| $401,000 to 500,000 | 7 |
| $501,000+ | 8 |
| Less than 20% | 9 |
| 21-40% | 10 |
| 41-60% | 11 |
| 61-80% | 12 |
| 81-100% | 13 |
| Less than 10 | 14 |
| 11-20 | 15 |
| 21-30 | 16 |
| 31-40 | 17 |
| 41-50 | 18 |
| 51+ | 19 |
| 1-2 | 20 |
| 3-4 | 21 |
| 5-6 | 22 |
| 7-8 | 23 |
| 9-10 | 24 |
| 10+ | 25 |
| No ADP Plan | 26 |
| Management | 27 |
| MS Exchange | 28 |
| No Other | 29 |
| 0-50 beds | 30 |
| 51-100 beds | 31 |
| 101-150 beds | 32 |
| 151-200 beds | 33 |
| 200+ beds | 34 |
| Servers | 35 |
| Internet/Intranet | 36 |

# APPENDIX C. CORRELATION FOR DEPENDENT MEASURE AND INDEPENDENT ITEMS

| Dep Measure & Independent Items / Pearson Correlation Sig. (1-tailed) | Size of MTF | MTF Clinics | Hours a day Planning (TIME) | Hours a day Implementing (TIME) | Allocated in IS Budget (MONEY) | % IS budget actually spent (MONEY) | % Spent Dept Training (MONEY) |
|---|---|---|---|---|---|---|---|
| Size of MTF | . | 0.14 | 0.46 | 0.28 | 0.34 | 0.29 | 0.19 |
| MTF Clinics | 0.14 | . | 0.08 | 0.14 | 0.20 | 0.09 | 0.23 |
| Hours a day Planning (TIME) | 0.46 | 0.08 | . | 0.00 | 0.06 | 0.00 | 0.00 |
| Hours a day Implementing (TIME) | 0.28 | 0.14 | 0.00 | . | 0.08 | 0.00 | 0.00 |
| Allocated in IS Budget (MONEY) | 0.34 | 0.20 | 0.06 | 0.08 | . | 0.38 | 0.09 |
| % IS budget actually spent (MONEY) | 0.29 | 0.09 | 0.00 | 0.00 | 0.38 | . | 0.00 |
| % Spent Dept Training (MONEY) | 0.19 | 0.23 | 0.00 | 0.00 | 0.09 | 0.00 | . |
| Staff Assigned to MID (STAFF) | 0.00 | 0.16 | 0.35 | 0.13 | 0.12 | 0.23 | 0.14 |
| Perm Staff Assigned (to MID STAFF) | 0.00 | 0.14 | 0.44 | 0.20 | 0.41 | 0.18 | 0.16 |
| Add Staff Needed (in MID (STAFF) | 0.08 | 0.22 | 0.36 | 0.35 | 0.03 | 0.33 | 0.16 |
| Staff Involved in Planning (SI) | 0.33 | 0.30 | 0.02 | 0.08 | 0.11 | 0.37 | 0.15 |
| Staff Involved in Implementing (SI) | 0.31 | 0.01 | 0.26 | 0.16 | 0.29 | 0.06 | 0.48 |
| Staff Involved in Evaluating (SI) | 0.17 | 0.07 | 0.01 | 0.01 | 0.29 | 0.00 | 0.00 |
| Years Workflow Mgmt (CIO Exp/Train) | 0.01 | 0.04 | 0.39 | 0.49 | 0.29 | 0.41 | 0.40 |
| Years Scanning Equip (CIO Exp/Train) | 0.17 | 0.39 | 0.37 | 0.47 | 0.38 | 0.12 | 0.10 |
| Years Imaging (CIO Exp/Train) | 0.15 | 0.14 | 0.37 | 0.48 | 0.21 | 0.12 | 0.28 |
| Years Internet (CIO Exp/Train) | 0.40 | 0.48 | 0.25 | 0.25 | 0.36 | 0.16 | 0.36 |
| Years Intranet (CIO Exp/Train) | 0.25 | 0.19 | 0.42 | 0.45 | 0.03 | 0.30 | 0.43 |
| Years Network (CIO Exp/Train) | 0.41 | 0.07 | 0.18 | 0.24 | 0.12 | 0.17 | 0.17 |
| Years DB (CIO Exp/Train) | 0.24 | 0.09 | 0.10 | 0.16 | 0.15 | 0.08 | 0.08 |
| Years EDI (CIO Exp/Train) | 0.33 | 0.48 | 0.44 | 0.41 | 0.15 | 0.38 | 0.48 |
| Years E-mail (CIO Exp/Train) | 0.36 | 0.26 | 0.09 | 0.21 | 0.01 | 0.12 | 0.12 |
| Years Ofc97 (CIO Exp/Train) | 0.03 | 0.24 | 0.25 | 0.48 | 0.09 | 0.25 | 0.30 |
| Years ADT (CIO Exp/Train) | 0.43 | 0.20 | 0.45 | 0.48 | 0.12 | 0.24 | 0.25 |
| Years Other (CIO Exp/Train) | 0.23 | 0.24 | 0.42 | 0.43 | 0.28 | 0.44 | 0.15 |
| Years CIO (CIO Exp/Train) | 0.48 | 0.43 | 0.22 | 0.47 | 0.09 | 0.39 | 0.14 |
| E-mail Receive/Send daily (CIO Comm) | 0.48 | 0.00 | 0.05 | 0.15 | 0.01 | 0.33 | 0.15 |
| PhoneCalls Make/Rec Daily (CIO Comm) | 0.08 | 0.28 | 0.35 | 0.16 | 0.12 | 0.11 | 0.19 |
| Conferences Attend (CIO Comm) | 0.34 | 0.28 | 0.12 | 0.48 | 0.12 | 0.38 | 0.41 |
| Hours work per week w/upper mgmt (Salience) | 0.33 | 0.50 | 0.00 | 0.03 | 0.20 | 0.00 | 0.00 |
| Hours day work/w command staff (Salience) | 0.21 | 0.36 | 0.00 | 0.00 | 0.25 | 0.00 | 0.01 |
| CO support (Salience) | 0.45 | 0.02 | 0.19 | 0.19 | 0.41 | 0.31 | 0.09 |
| PLO flt dept priority scheme (CIO Participation) | 0.42 | 0.01 | 0.07 | 0.26 | 0.43 | 0.11 | 0.24 |
| CIO participate in command's strategic planning | 0.20 | 0.46 | 0.06 | 0.09 | 0.16 | 0.30 | 0.37 |
| Info tech easy install/configure (Info Tech) | 0.45 | 0.36 | 0.35 | 0.43 | 0.03 | 0.44 | 0.30 |
| Info tech easy integrate w/other systems (Info T | 0.40 | 0.43 | 0.04 | 0.22 | 0.14 | 0.35 | 0.17 |
| Info tech reused annually (Info Tech) | 0.07 | 0.48 | 0.40 | 0.38 | 0.09 | 0.45 | 0.45 |

| Dep Measure & Independent Items | Size of MTF | MTF Clinics | Hours a day Planning (TIME) | Hours a day Implementing (TIME) | Allocated in IS Budget (MONEY) | % IS budget actually spent (MONEY) | % Spent Dept Training (MONEY) |
|---|---|---|---|---|---|---|---|
| Info tech disposed annually (Info Tech) | 0.27 | 0.04 | 0.39 | 0.50 | 0.37 | 0.45 | 0.20 |
| Purchase Info tech annually (Info Tech) | 0.13 | 0.03 | 0.08 | 0.06 | 0.43 | 0.10 | 0.07 |
| Command have ADP Plan (Info Tech) | 0.02 | 0.28 | 0.38 | 0.35 | 0.12 | 0.11 | 0.19 |
| PLO Included in ADP (Info Tech) | 0.02 | 0.35 | 0.33 | 0.43 | 0.12 | 0.14 | 0.22 |
| ADP Plan Incorporated into Strategic Plan | 0.02 | 0.25 | 0.46 | 0.30 | 0.14 | 0.09 | 0.16 |
| Workflow mgmt used (Dep Var) | 0.43 | 0.08 | 0.22 | 0.14 | 0.50 | 0.35 | 0.39 |
| Imagining/scanning used (Dep Var) | 0.14 | 0.36 | 0.16 | 0.12 | 0.43 | 0.26 | 0.28 |
| Internet used (Dep Var) | 0.29 | 0.31 | 0.44 | 0.07 | 0.49 | 0.10 | 0.13 |
| Intranet used (Dep Var) | 0.10 | 0.07 | 0.46 | 0.18 | 0.43 | 0.39 | 0.21 |
| To what extent are DB used (Dep Var) | 0.47 | 0.33 | 0.34 | 0.24 | 0.28 | 0.40 | 0.40 |
| EDI used (Dep Var) | 0.37 | 0.14 | 0.22 | 0.29 | 0.02 | 0.34 | 0.16 |
| E-mail (Dep Var) | 0.13 | 0.44 | 0.29 | 0.13 | 0.27 | 0.29 | 0.13 |
| Office 97 Apps used (Dep Var) | 0.29 | 0.43 | 0.45 | 0.31 | 0.21 | 0.42 | 0.32 |
| Auto Doc Track used (Dep Var) | 0.46 | 0.26 | 0.34 | 0.18 | 0.07 | 0.46 | 0.43 |
| Greatest Achievement | 0.28 | 0.15 | 0.37 | 0.26 | 0.03 | 0.36 | 0.45 |

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

No Significance

| | Staff Assigned to MID (STAFF) | Perm Staff Assigned (to MID STAFF) | Add Staff Needed (In MID (STAFF) | Staff Involved in Planning (SI) | Staff Involved in Implementing (SI) | Staff Involved in Evaluating (SI) | Years Workflow Mgmt (CIO Exp/Train) | Years Scanning Equip (CIO Exp/Train) | Years Imaging (CIO Exp/Train) |
|---|---|---|---|---|---|---|---|---|---|
| Size of MTF | 0.00 | 0.00 | 0.08 | 0.33 | 0.31 | 0.17 | 0.01 | 0.17 | 0.15 |
| MTF Clinics | 0.16 | 0.14 | 0.22 | 0.30 | 0.01 | 0.07 | 0.04 | 0.39 | 0.14 |
| Hours a day Planning (TIME) | 0.35 | 0.44 | 0.36 | 0.02 | 0.26 | 0.01 | 0.39 | 0.37 | 0.37 |
| Hours a day Implementing (TIME) | 0.13 | 0.20 | 0.35 | 0.08 | 0.16 | 0.01 | 0.49 | 0.47 | 0.48 |
| Allocated in IS Budget (MONEY) | 0.12 | 0.41 | 0.03 | 0.11 | 0.29 | 0.29 | 0.29 | 0.38 | 0.21 |
| % IS budget actually spent (MONEY) | 0.23 | 0.18 | 0.33 | 0.37 | 0.06 | 0.00 | 0.41 | 0.12 | 0.12 |
| % Spent Dept Training (MONEY) | 0.14 | 0.16 | 0.16 | 0.15 | 0.48 | 0.00 | 0.40 | 0.10 | 0.28 |
| Staff Assigned to MID (STAFF) | | 0.00 | 0.03 | 0.20 | 0.30 | 0.15 | 0.09 | 0.22 | 0.30 |
| Perm Staff Assigned (to MID STAFF) | 0.00 | | 0.04 | 0.34 | 0.24 | 0.16 | 0.09 | 0.17 | 0.40 |
| Add Staff Needed (in MID (STAFF) | 0.03 | 0.04 | | 0.26 | 0.29 | 0.47 | 0.25 | 0.09 | 0.30 |
| Staff Involved in Planning (SI) | 0.20 | 0.34 | 0.26 | | 0.05 | 0.07 | 0.35 | 0.26 | 0.08 |
| Staff Involved in Implementing (SI) | 0.30 | 0.24 | 0.29 | 0.05 | | 0.01 | 0.49 | 0.45 | 0.43 |
| Staff Involved in Evaluating (SI) | 0.15 | 0.16 | 0.47 | 0.07 | 0.01 | | 0.36 | 0.09 | 0.12 |
| Years Workflow Mgmt (CIO Exp/Train) | 0.09 | 0.09 | 0.25 | 0.35 | 0.49 | 0.36 | | 0.30 | 0.11 |
| Years Scanning Equip (CIO Exp/Train) | 0.22 | 0.17 | 0.09 | 0.26 | 0.45 | 0.09 | 0.30 | | 0.01 |
| Years Imaging (CIO Exp/Train) | 0.30 | 0.40 | 0.30 | 0.08 | 0.43 | 0.12 | 0.11 | 0.01 | |
| Years Internet (CIO Exp/Train) | 0.42 | 0.36 | 0.31 | 0.42 | 0.09 | 0.07 | 0.01 | 0.08 | 0.11 |
| Years Intranet (CIO Exp/Train) | 0.30 | 0.38 | 0.10 | 0.19 | 0.13 | 0.39 | 0.00 | 0.39 | 0.17 |
| Years Network (CIO Exp/Train) | 0.22 | 0.25 | 0.21 | 0.35 | 0.10 | 0.09 | 0.05 | 0.16 | 0.28 |
| Years DB (CIO Exp/Train) | 0.44 | 0.44 | 0.06 | 0.09 | 0.34 | 0.36 | 0.04 | 0.22 | 0.23 |
| Years EDI (CIO Exp/Train) | 0.47 | 0.42 | 0.23 | 0.12 | 0.09 | 0.43 | 0.02 | 0.37 | 0.34 |
| Years E-mail (CIO Exp/Train) | 0.31 | 0.45 | 0.34 | 0.33 | 0.21 | 0.05 | 0.07 | 0.01 | 0.19 |
| Years Ofc97 (CIO Exp/Train) | 0.10 | 0.05 | 0.17 | 0.09 | 0.50 | 0.18 | 0.07 | 0.03 | 0.04 |
| Years ADT (CIO Exp/Train) | 0.21 | 0.11 | 0.01 | 0.35 | 0.50 | 0.35 | 0.23 | 0.04 | 0.07 |
| Years Other (CIO Exp/Train) | 0.32 | 0.24 | 0.31 | 0.49 | 0.40 | 0.14 | 0.20 | 0.36 | 0.02 |
| Years CIO (CIO Exp/Train) | 0.19 | 0.15 | 0.25 | 0.33 | 0.44 | 0.24 | 0.29 | 0.00 | 0.19 |
| E-mail Receive/Send daily (CIO Comm) | 0.36 | 0.50 | 0.11 | 0.43 | 0.28 | 0.48 | 0.07 | 0.18 | 0.04 |
| PhoneCalls Make/Rec Daily (CIO Comm) | 0.09 | 0.04 | 0.37 | 0.18 | 0.20 | 0.23 | 0.12 | 0.28 | 0.34 |
| Conferences Attend (CIO Comm) | 0.15 | 0.18 | 0.08 | 0.06 | 0.28 | 0.17 | 0.43 | 0.37 | 0.32 |
| Hours work per week w/upper mgmt (Salience) | 0.31 | 0.35 | 0.40 | 0.08 | 0.38 | 0.00 | 0.44 | 0.23 | 0.22 |
| Hours day work/w command staff (Salience) | 0.47 | 0.43 | 0.04 | 0.01 | 0.25 | 0.02 | 0.33 | 0.18 | 0.35 |
| CO support (Salience) | 0.18 | 0.25 | 0.31 | 0.48 | 0.09 | 0.06 | 0.38 | 0.49 | 0.38 |
| PLO flt dept priority scheme (CIO Participation) | 0.21 | 0.15 | 0.27 | 0.19 | 0.26 | 0.18 | 0.46 | 0.38 | 0.04 |
| CIO participate in command's strategic planning | 0.43 | 0.39 | 0.30 | 0.11 | 0.25 | 0.17 | 0.16 | 0.39 | 0.24 |
| Info tech easy install/configure (Info Tech) | 0.19 | 0.34 | 0.17 | 0.38 | 0.24 | 0.45 | 0.20 | 0.48 | 0.02 |
| Info tech easy integrate w/other systems (Info T | 0.15 | 0.31 | 0.40 | 0.01 | 0.39 | 0.22 | 0.16 | 0.49 | 0.03 |
| Info tech reused annually (Info Tech) | 0.09 | 0.14 | 0.14 | 0.29 | 0.33 | 0.32 | 0.48 | 0.33 | 0.02 |

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| | Staff Assigned to MID (STAFF) | Perm Staff Assigned (to MID STAFF) | Add Staff Needed (In MID (STAFF) | Staff Involved In Planning (SI) | Staff Involved In Implementing (SI) | Staff Involved In Evaluating (SI) | Years Workflow Mgmt (CIO Exp/Train) | Years Scanning Equip (CIO Exp/Train) | Years Imaging (CIO Exp/Train) |
|---|---|---|---|---|---|---|---|---|---|
| Info tech disposed annually (Info Tech) | 0.41 | 0.45 | 0.19 | 0.32 | 0.20 | 0.43 | 0.02 | 0.12 | 0.10 |
| Purchase Info tech annually (Info Tech) | 0.02 | 0.03 | 0.48 | 0.18 | 0.13 | 0.05 | 0.14 | 0.39 | 0.34 |
| Command have ADP Plan (Info Tech) | 0.03 | 0.01 | 0.11 | 0.03 | 0.28 | 0.23 | 0.25 | 0.13 | 0.05 |
| PLO Included in ADP (Info Tech) | 0.04 | 0.01 | 0.11 | 0.02 | 0.21 | 0.27 | 0.26 | 0.11 | 0.04 |
| ADP Plan Incorporated into Strategic Plan | 0.04 | 0.01 | 0.09 | 0.03 | 0.24 | 0.30 | 0.28 | 0.10 | 0.07 |
| Workflow mgmt used (Dep Var) | 0.40 | 0.39 | 0.23 | 0.14 | 0.21 | 0.09 | 0.01 | 0.32 | 0.44 |
| Imagining/scanning used (Dep Var) | 0.36 | 0.34 | 0.43 | 0.35 | 0.34 | 0.15 | 0.46 | 0.26 | 0.08 |
| Internet used (Dep Var) | 0.41 | 0.37 | 0.49 | 0.44 | 0.32 | 0.08 | 0.43 | 0.29 | 0.10 |
| Intranet used (Dep Var) | 0.24 | 0.18 | 0.30 | 0.06 | 0.14 | 0.19 | 0.14 | 0.40 | 0.33 |
| To what extent are DB used (Dep Var) | 0.33 | 0.48 | 0.37 | 0.48 | 0.30 | 0.24 | 0.48 | 0.22 | 0.34 |
| EDI used (Dep Var) | 0.46 | 0.38 | 0.38 | 0.49 | 0.36 | 0.37 | 0.16 | 0.42 | 0.44 |
| E-mail (Dep Var) | 0.34 | 0.31 | 0.39 | 0.12 | 0.36 | 0.36 | 0.17 | 0.15 | 0.37 |
| Office 97 Apps used (Dep Var) | 0.27 | 0.41 | 0.46 | 0.34 | 0.40 | 0.23 | 0.26 | 0.15 | 0.41 |
| Auto Doc Track used (Dep Var) | 0.46 | 0.44 | 0.27 | 0.22 | 0.36 | 0.18 | 0.08 | 0.35 | 0.30 |
| Greatest Achievement | 0.31 | 0.48 | 0.06 | 0.16 | 0.10 | 0.17 | 0.16 | 0.37 | 0.29 |
| Correlation is significant at the 0.01 level (1-tailed). | | | | | | | | | |
| Correlation is significant at the 0.05 level (1-tailed). | | | | | | | | | |
| No Significance | | | | | | | | | |

| | Years Internet (CIO Exp/Train) | Years Intranet (CIO Exp/Train) | Years Network (CIO Exp/Train) | Years DB (CIO Exp/Train) | Years EDI (CIO Exp/Train) | Years E-mail (CIO Exp/Train) | Years Ofc97 (CIO Exp/Train) | Years ADT (CIO Exp/Train) | Years Other (CIO Exp/Train) |
|---|---|---|---|---|---|---|---|---|---|
| Size of MTF | 0.40 | 0.25 | 0.41 | 0.24 | 0.33 | 0.36 | 0.03 | 0.43 | 0.23 |
| MTF Clinics | 0.48 | 0.19 | 0.07 | 0.09 | 0.48 | 0.26 | 0.24 | 0.20 | 0.24 |
| Hours a day Planning (TIME) | 0.25 | 0.42 | 0.18 | 0.10 | 0.44 | 0.09 | 0.25 | 0.45 | 0.42 |
| Hours a day Implementing (TIME) | 0.25 | 0.45 | 0.24 | 0.16 | 0.41 | 0.21 | 0.48 | 0.48 | 0.43 |
| Allocated in IS Budget (MONEY) | 0.36 | 0.03 | 0.12 | 0.15 | 0.15 | 0.01 | 0.09 | 0.12 | 0.28 |
| % IS budget actually spent (MONEY) | 0.16 | 0.30 | 0.17 | 0.08 | 0.38 | 0.12 | 0.25 | 0.24 | 0.44 |
| % Spent Dept Training (MONEY) | 0.36 | 0.43 | 0.17 | 0.08 | 0.48 | 0.12 | 0.30 | 0.25 | 0.15 |
| Staff Assigned to MID (STAFF) | 0.42 | 0.30 | 0.22 | 0.44 | 0.47 | 0.31 | 0.10 | 0.21 | 0.32 |
| Perm Staff Assigned (to MID STAFF) | 0.36 | 0.38 | 0.25 | 0.44 | 0.42 | 0.45 | 0.05 | 0.11 | 0.24 |
| Add Staff Needed (In MID (STAFF) | 0.31 | 0.10 | 0.21 | 0.06 | 0.23 | 0.34 | 0.17 | 0.01 | 0.31 |
| Staff Involved in Planning (SI) | 0.42 | 0.19 | 0.35 | 0.09 | 0.12 | 0.33 | 0.09 | 0.35 | 0.49 |
| Staff Involved in Implementing (SI) | 0.09 | 0.13 | 0.10 | 0.34 | 0.09 | 0.21 | 0.50 | 0.50 | 0.40 |
| Staff Involved in Evaluating (SI) | 0.07 | 0.39 | 0.09 | 0.36 | 0.43 | 0.05 | 0.18 | 0.35 | 0.14 |
| Years Workflow Mgmt (CIO Exp/Train) | 0.01 | 0.00 | 0.05 | 0.04 | 0.02 | 0.07 | 0.07 | 0.23 | 0.20 |
| Years Scanning Equip (CIO Exp/Train) | 0.08 | 0.39 | 0.16 | 0.22 | 0.37 | 0.01 | 0.03 | 0.04 | 0.36 |
| Years Imaging (CIO Exp/Train) | 0.11 | 0.17 | 0.28 | 0.23 | 0.34 | 0.19 | 0.04 | 0.07 | 0.02 |
| Years Internet (CIO Exp/Train) | | 0.00 | 0.00 | 0.05 | 0.01 | 0.00 | 0.41 | 0.38 | 0.30 |
| Years Intranet (CIO Exp/Train) | 0.00 | | 0.01 | 0.04 | 0.00 | 0.09 | 0.31 | 0.23 | 0.22 |
| Years Network (CIO Exp/Train) | 0.00 | 0.01 | | 0.00 | 0.00 | 0.00 | 0.44 | 0.10 | 0.44 |
| Years DB (CIO Exp/Train) | 0.05 | 0.04 | 0.00 | | 0.02 | 0.03 | 0.16 | 0.06 | 0.33 |
| Years EDI (CIO Exp/Train) | 0.01 | 0.00 | 0.00 | 0.02 | | 0.14 | 0.32 | 0.36 | 0.46 |
| Years E-mail (CIO Exp/Train) | 0.00 | 0.09 | 0.00 | 0.03 | 0.14 | | 0.41 | 0.06 | 0.36 |
| Years Ofc97 (CIO Exp/Train) | 0.41 | 0.31 | 0.44 | 0.16 | 0.32 | 0.41 | | 0.23 | 0.19 |
| Years ADT (CIO Exp/Train) | 0.38 | 0.23 | 0.10 | 0.06 | 0.36 | 0.06 | 0.23 | | 0.28 |
| Years Other (CIO Exp/Train) | 0.30 | 0.22 | 0.44 | 0.33 | 0.46 | 0.36 | 0.19 | 0.28 | |
| Years CIO (CIO Exp/Train) | 0.17 | 0.47 | 0.21 | 0.48 | 0.17 | 0.00 | 0.27 | 0.11 | 0.35 |
| E-mail Receive/Send daily (CIO Comm) | 0.29 | 0.04 | 0.19 | 0.04 | 0.28 | 0.37 | 0.35 | 0.29 | 0.23 |
| PhoneCalls Make/Rec Daily (CIO Comm) | 0.08 | 0.00 | 0.02 | 0.09 | 0.00 | 0.28 | 0.28 | 0.42 | 0.29 |
| Conferences Attend (CIO Comm) | 0.28 | 0.25 | 0.23 | 0.16 | 0.41 | 0.36 | 0.34 | 0.11 | 0.20 |
| Hours work per week w/upper mgmt (Salience) | 0.19 | 0.42 | 0.17 | 0.42 | 0.39 | 0.07 | 0.43 | 0.41 | 0.23 |
| Hours day work/w command staff (Salience) | 0.34 | 0.39 | 0.38 | 0.34 | 0.42 | 0.46 | 0.09 | 0.12 | 0.37 |
| CO support (Salience) | 0.10 | 0.19 | 0.02 | 0.07 | 0.03 | 0.26 | 0.26 | 0.29 | 0.03 |
| PLO fit dept priority scheme (CIO Participation) | 0.41 | 0.48 | 0.26 | 0.15 | 0.34 | 0.49 | 0.26 | 0.35 | 0.22 |
| CIO participate in command's strategic planning | 0.47 | 0.34 | 0.37 | 0.24 | 0.31 | 0.19 | 0.21 | 0.20 | 0.04 |
| Info tech easy install/configure (Info Tech) | 0.28 | 0.39 | 0.07 | 0.07 | 0.23 | 0.15 | 0.09 | 0.27 | 0.05 |
| Info tech easy integrate w/other systems (Info T | 0.24 | 0.46 | 0.32 | 0.46 | 0.23 | 0.24 | 0.18 | 0.45 | 0.02 |
| Info tech reused annually (Info Tech) | 0.34 | 0.31 | 0.13 | 0.13 | 0.16 | 0.28 | 0.08 | 0.37 | 0.01 |

| | Years Internet (CIO Exp/Train) | Years Intranet (CIO Exp/Train) | Years Network (CIO Exp/Train) | Years DB (CIO Exp/Train) | Years EDI (CIO Exp/Train) | Years E-mail (CIO Exp/Train) | Years Ofc97 (CIO Exp/Train) | Years ADT (CIO Exp/Train) | Years Other (CIO Exp/Train) |
|---|---|---|---|---|---|---|---|---|---|
| Info tech disposed annually (Info Tech) | 0.43 | 0.15 | 0.25 | 0.14 | 0.12 | 0.17 | 0.18 | 0.02 | 0.37 |
| Purchase info tech annually (Info Tech) | 0.34 | 0.43 | 0.32 | 0.26 | 0.26 | 0.41 | 0.28 | 0.13 | 0.23 |
| Command have ADP Plan (Info Tech) | 0.49 | 0.45 | 0.41 | 0.50 | 0.39 | 0.37 | 0.00 | 0.09 | 0.29 |
| PLO included in ADP (Info Tech) | 0.48 | 0.45 | 0.44 | 0.45 | 0.35 | 0.40 | 0.00 | 0.08 | 0.30 |
| ADP Plan incorporated into Strategic Plan | 0.42 | 0.49 | 0.42 | 0.41 | 0.38 | 0.37 | 0.00 | 0.05 | 0.39 |
| Workflow mgmt used (Dep Var) | 0.09 | 0.00 | 0.12 | 0.07 | 0.01 | 0.14 | 0.16 | 0.37 | 0.10 |
| Imagining/scanning used (Dep Var) | 0.30 | 0.21 | 0.42 | 0.15 | 0.35 | 0.38 | 0.08 | 0.13 | 0.05 |
| Internet used (Dep Var) | 0.20 | 0.36 | 0.38 | 0.29 | 0.46 | 0.19 | 0.31 | 0.41 | 0.32 |
| Intranet used (Dep Var) | 0.29 | 0.29 | 0.47 | 0.36 | 0.19 | 0.43 | 0.28 | 0.27 | 0.47 |
| To what extent are DB used (Dep Var) | 0.16 | 0.45 | 0.21 | 0.47 | 0.22 | 0.49 | 0.47 | 0.22 | 0.17 |
| EDI used (Dep Var) | 0.23 | 0.01 | 0.41 | 0.35 | 0.04 | 0.13 | 0.47 | 0.03 | 0.38 |
| E-mail (Dep Var) | 0.31 | 0.12 | 0.04 | 0.06 | 0.04 | 0.37 | 0.27 | 0.49 | 0.44 |
| Office 97 Apps used (Dep Var) | 0.24 | 0.20 | 0.05 | 0.14 | 0.09 | 0.34 | 0.19 | 0.31 | 0.47 |
| Auto Doc Track used (Dep Var) | 0.13 | 0.01 | 0.25 | 0.40 | 0.01 | 0.42 | 0.17 | 0.20 | 0.18 |
| Greatest Achievement | 0.28 | 0.07 | 0.15 | 0.32 | 0.08 | 0.46 | 0.31 | 0.50 | 0.42 |
| Correlation is significant at the 0.01 level (1-tailed). | | | | | | | | | |
| Correlation is significant at the 0.05 level (1-tailed). | | | | | | | | | |
| No Significance | | | | | | | | | |

| | Years CIO (CIO Exp/Train) | E-mail Receive/Send daily (CIO Comm) | PhoneCalls Make/Rec Daily (CIO Comm) | Conferences Attend (CIO Comm) | Hours work per week w/upper mgmt (Salience) | Hours day work/w command staff (Salience) | CO support (Salience) | PLO fit dept priority scheme (CIO Participation) | CIO participate in command's strategic planning (CIO Participation) |
|---|---|---|---|---|---|---|---|---|---|
| Size of MTF | 0.48 | 0.48 | 0.08 | 0.34 | 0.33 | 0.21 | 0.45 | 0.42 | 0.20 |
| MTF Clinics | 0.43 | 0.00 | 0.28 | 0.28 | 0.50 | 0.36 | 0.02 | 0.01 | 0.46 |
| Hours a day Planning (TIME) | 0.22 | 0.05 | 0.35 | 0.12 | 0.00 | 0.00 | 0.19 | 0.07 | 0.06 |
| Hours a day Implementing (TIME) | 0.47 | 0.15 | 0.16 | 0.48 | 0.03 | 0.00 | 0.19 | 0.26 | 0.09 |
| Allocated in IS Budget (MONEY) | 0.09 | 0.01 | 0.12 | 0.12 | 0.20 | 0.25 | 0.41 | 0.43 | 0.16 |
| % IS budget actually spent (MONEY) | 0.39 | 0.33 | 0.11 | 0.38 | 0.00 | 0.00 | 0.31 | 0.11 | 0.30 |
| % Spent Dept Training (MONEY) | 0.14 | 0.15 | 0.19 | 0.41 | 0.00 | 0.01 | 0.09 | 0.24 | 0.37 |
| Staff Assigned to MID (STAFF) | 0.19 | 0.36 | 0.09 | 0.15 | 0.31 | 0.47 | 0.18 | 0.21 | 0.43 |
| Perm Staff Assigned (to MID STAFF) | 0.15 | 0.50 | 0.04 | 0.18 | 0.35 | 0.43 | 0.25 | 0.15 | 0.39 |
| Add Staff Needed (in MID (STAFF) | 0.25 | 0.11 | 0.37 | 0.08 | 0.40 | 0.04 | 0.31 | 0.27 | 0.30 |
| Staff Involved in Planning (SI) | 0.33 | 0.43 | 0.18 | 0.06 | 0.08 | 0.01 | 0.48 | 0.19 | 0.11 |
| Staff Involved in Implementing (SI) | 0.44 | 0.28 | 0.20 | 0.28 | 0.38 | 0.25 | 0.09 | 0.26 | 0.25 |
| Staff Involved in Evaluating (SI) | 0.24 | 0.48 | 0.23 | 0.17 | 0.00 | 0.02 | 0.06 | 0.18 | 0.17 |
| Years Workflow Mgmt (CIO Exp/Train) | 0.29 | 0.07 | 0.12 | 0.43 | 0.44 | 0.33 | 0.38 | 0.46 | 0.16 |
| Years Scanning Equip (CIO Exp/Train) | 0.00 | 0.18 | 0.28 | 0.37 | 0.23 | 0.18 | 0.49 | 0.38 | 0.39 |
| Years Imaging (CIO Exp/Train) | 0.19 | 0.04 | 0.34 | 0.32 | 0.22 | 0.35 | 0.38 | 0.04 | 0.24 |
| Years Internet (CIO Exp/Train) | 0.17 | 0.29 | 0.08 | 0.28 | 0.19 | 0.34 | 0.10 | 0.41 | 0.47 |
| Years Intranet (CIO Exp/Train) | 0.47 | 0.04 | 0.00 | 0.25 | 0.42 | 0.39 | 0.19 | 0.48 | 0.34 |
| Years Network (CIO Exp/Train) | 0.21 | 0.19 | 0.02 | 0.23 | 0.17 | 0.38 | 0.02 | 0.26 | 0.37 |
| Years DB (CIO Exp/Train) | 0.48 | 0.04 | 0.09 | 0.16 | 0.42 | 0.34 | 0.07 | 0.15 | 0.24 |
| Years EDI (CIO Exp/Train) | 0.17 | 0.28 | 0.00 | 0.41 | 0.39 | 0.42 | 0.03 | 0.34 | 0.31 |
| Years E-mail (CIO Exp/Train) | 0.00 | 0.37 | 0.28 | 0.36 | 0.07 | 0.46 | 0.26 | 0.49 | 0.19 |
| Years Ofc97 (CIO Exp/Train) | 0.27 | 0.35 | 0.28 | 0.34 | 0.43 | 0.09 | 0.26 | 0.26 | 0.21 |
| Years ADT (CIO Exp/Train) | 0.11 | 0.29 | 0.42 | 0.11 | 0.41 | 0.12 | 0.29 | 0.35 | 0.20 |
| Years Other (CIO Exp/Train) | 0.35 | 0.23 | 0.29 | 0.20 | 0.23 | 0.37 | 0.03 | 0.22 | 0.04 |
| Years CIO (CIO Exp/Train) | | 0.36 | 0.23 | 0.41 | 0.21 | 0.14 | 0.24 | 0.10 | 0.30 |
| E-mail Receive/Send daily (CIO Comm) | 0.36 | | 0.40 | 0.14 | 0.47 | 0.26 | 0.05 | 0.03 | 0.20 |
| PhoneCalls Make/Rec Daily (CIO Comm) | 0.23 | 0.40 | | 0.24 | 0.25 | 0.47 | 0.11 | 0.16 | 0.14 |
| Conferences Attend (CIO Comm) | 0.41 | 0.14 | 0.24 | | 0.09 | 0.14 | 0.26 | 0.36 | 0.40 |
| Hours work per week w/upper mgmt (Salience) | 0.21 | 0.47 | 0.25 | 0.09 | | 0.01 | 0.18 | 0.27 | 0.23 |
| Hours day work/w command staff (Salience) | 0.14 | 0.26 | 0.47 | 0.14 | 0.01 | | 0.23 | 0.05 | 0.04 |
| CO support (Salience) | 0.24 | 0.05 | 0.11 | 0.26 | 0.18 | 0.23 | | 0.18 | 0.10 |
| PLO fit dept priority scheme (CIO Participation) | 0.10 | 0.03 | 0.16 | 0.36 | 0.27 | 0.05 | 0.18 | | 0.16 |
| CIO participate in command's strategic planning | 0.30 | 0.20 | 0.14 | 0.40 | 0.23 | 0.04 | 0.10 | 0.16 | |
| Info tech easy install/configure (Info Tech) | 0.34 | 0.04 | 0.41 | 0.02 | 0.36 | 0.19 | 0.22 | 0.02 | 0.05 |
| Info tech easy integrate w/other systems (Info T | 0.47 | 0.22 | 0.44 | 0.37 | 0.09 | 0.03 | 0.44 | 0.01 | 0.01 |
| Info tech reused annually (Info Tech) | 0.24 | 0.14 | 0.16 | 0.26 | 0.47 | 0.47 | 0.46 | 0.46 | 0.39 |

| | Years CIO (CIO Exp/Train) | E-mail Receive/Send daily (CIO Comm) | PhoneCalls Make/Rec Daily (CIO Comm) | Conferences Attend (CIO Comm) | Hours work per week w/upper mgmt (Salience) | Hours day work/w command staff (Salience) | CO support (Salience) | PLO fit dept priority scheme (CIO Participation) | CIO participate in command's strategic planning (CIO Participation) |
|---|---|---|---|---|---|---|---|---|---|
| Info tech disposed annually (Info Tech) | 0.30 | 0.22 | 0.32 | 0.25 | 0.16 | 0.38 | 0.42 | 0.17 | 0.50 |
| Purchase Info tech annually (Info Tech) | 0.07 | 0.11 | 0.27 | 0.21 | 0.26 | 0.04 | 0.00 | 0.00 | 0.37 |
| Command have ADP Plan (Info Tech) | 0.47 | 0.40 | 0.02 | 0.24 | 0.33 | 0.15 | 0.46 | 0.44 | 0.14 |
| PLO Included in ADP (Info Tech) | 0.46 | 0.37 | 0.03 | 0.25 | 0.30 | 0.10 | 0.48 | 0.50 | 0.11 |
| ADP Plan Incorporated Into Strategic Plan | 0.49 | 0.48 | 0.03 | 0.21 | 0.42 | 0.15 | 0.44 | 0.36 | 0.28 |
| Workflow mgmt used (Dep Var) | 0.40 | 0.25 | 0.02 | 0.35 | 0.21 | 0.43 | 0.30 | 0.36 | 0.20 |
| Imagining/scanning used (Dep Var) | 0.48 | 0.47 | 0.14 | 0.43 | 0.13 | 0.36 | 0.06 | 0.43 | 0.32 |
| Internet used (Dep Var) | 0.18 | 0.30 | 0.35 | 0.08 | 0.06 | 0.09 | 0.09 | 0.20 | 0.17 |
| Intranet used (Dep Var) | 0.46 | 0.03 | 0.43 | 0.40 | 0.29 | 0.07 | 0.46 | 0.21 | 0.30 |
| To what extent are DB used (Dep Var) | 0.20 | 0.49 | 0.37 | 0.11 | 0.29 | 0.16 | 0.19 | 0.18 | 0.42 |
| EDI used (Dep Var) | 0.22 | 0.06 | 0.08 | 0.06 | 0.47 | 0.28 | 0.36 | 0.41 | 0.14 |
| E-mail (Dep Var) | 0.23 | 0.16 | 0.08 | 0.11 | 0.12 | 0.14 | 0.01 | 0.25 | 0.37 |
| Office 97 Apps used (Dep Var) | 0.13 | 0.23 | 0.09 | 0.01 | 0.15 | 0.15 | 0.00 | 0.30 | 0.19 |
| Auto Doc Track used (Dep Var) | 0.45 | 0.12 | 0.08 | 0.30 | 0.10 | 0.49 | 0.49 | 0.18 | 0.27 |
| Greatest Achievement | 0.18 | 0.38 | 0.10 | 0.10 | 0.25 | 0.18 | 0.32 | 0.00 | 0.42 |
| Correlation is significant at the 0.01 level (1-tailed). | | | | | | | | | |
| Correlation is significant at the 0.05 level (1-tailed). | | | | | | | | | |
| No Significance | | | | | | | | | |

| | Info tech easy Install/configure (Info Tech) | Info tech easy Integrate w/other systems (Info Tech) | Info tech reused annually (Info Tech) | Info tech disposed annually (Info Tech) | Purchase Info tech annually (Info Tech) | Command have ADP Plan (Info Tech) | PLO Included in ADP (Info Tech) | ADP Plan Incorporated into Strategic Plan | Workflow mgmt used (Dep Var) |
|---|---|---|---|---|---|---|---|---|---|
| Size of MTF | 0.45 | 0.40 | 0.07 | 0.27 | 0.13 | 0.02 | 0.02 | 0.02 | 0.43 |
| MTF Clinics | 0.36 | 0.43 | 0.48 | 0.04 | 0.03 | 0.28 | 0.35 | 0.25 | 0.08 |
| Hours a day Planning (TIME) | 0.35 | 0.04 | 0.40 | 0.39 | 0.08 | 0.38 | 0.33 | 0.46 | 0.22 |
| Hours a day Implementing (TIME) | 0.43 | 0.22 | 0.38 | 0.50 | 0.06 | 0.35 | 0.43 | 0.30 | 0.14 |
| Allocated in IS Budget (MONEY) | 0.03 | 0.14 | 0.09 | 0.37 | 0.43 | 0.12 | 0.12 | 0.14 | 0.50 |
| % IS budget actually spent (MONEY) | 0.44 | 0.35 | 0.45 | 0.45 | 0.10 | 0.11 | 0.14 | 0.09 | 0.35 |
| % Spent Dept Training (MONEY) | 0.30 | 0.17 | 0.45 | 0.20 | 0.07 | 0.19 | 0.22 | 0.16 | 0.39 |
| Staff Assigned to MID (STAFF) | 0.19 | 0.15 | 0.09 | 0.41 | 0.02 | 0.03 | 0.04 | 0.04 | 0.40 |
| Perm Staff Assigned (to MID STAFF) | 0.34 | 0.31 | 0.14 | 0.45 | 0.03 | 0.01 | 0.01 | 0.01 | 0.39 |
| Add Staff Needed (in MID (STAFF) | 0.17 | 0.40 | 0.14 | 0.19 | 0.48 | 0.11 | 0.11 | 0.09 | 0.23 |
| Staff Involved in Planning (SI) | 0.38 | 0.01 | 0.29 | 0.32 | 0.18 | 0.03 | 0.02 | 0.03 | 0.14 |
| Staff Involved in Implementing (SI) | 0.24 | 0.39 | 0.33 | 0.20 | 0.13 | 0.28 | 0.21 | 0.24 | 0.21 |
| Staff Involved in Evaluating (SI) | 0.45 | 0.22 | 0.32 | 0.43 | 0.05 | 0.23 | 0.27 | 0.30 | 0.09 |
| Years Workflow Mgmt (CIO Exp/Train) | 0.20 | 0.16 | 0.48 | 0.02 | 0.14 | 0.25 | 0.26 | 0.28 | 0.01 |
| Years Scanning Equip (CIO Exp/Train) | 0.48 | 0.49 | 0.33 | 0.12 | 0.39 | 0.13 | 0.11 | 0.10 | 0.32 |
| Years Imaging (CIO Exp/Train) | 0.02 | 0.03 | 0.02 | 0.10 | 0.34 | 0.05 | 0.04 | 0.07 | 0.44 |
| Years Internet (CIO Exp/Train) | 0.28 | 0.24 | 0.34 | 0.43 | 0.34 | 0.49 | 0.48 | 0.42 | 0.09 |
| Years Intranet (CIO Exp/Train) | 0.39 | 0.46 | 0.31 | 0.15 | 0.43 | 0.45 | 0.45 | 0.49 | 0.00 |
| Years Network (CIO Exp/Train) | 0.07 | 0.32 | 0.13 | 0.25 | 0.32 | 0.41 | 0.44 | 0.42 | 0.12 |
| Years DB (CIO Exp/Train) | 0.07 | 0.46 | 0.13 | 0.14 | 0.26 | 0.50 | 0.45 | 0.41 | 0.07 |
| Years EDI (CIO Exp/Train) | 0.23 | 0.23 | 0.16 | 0.12 | 0.26 | 0.39 | 0.35 | 0.38 | 0.01 |
| Years E-mail (CIO Exp/Train) | 0.15 | 0.24 | 0.28 | 0.17 | 0.41 | 0.37 | 0.40 | 0.37 | 0.14 |
| Years Ofc97 (CIO Exp/Train) | 0.09 | 0.18 | 0.08 | 0.18 | 0.28 | 0.00 | 0.00 | 0.00 | 0.16 |
| Years ADT (CIO Exp/Train) | 0.27 | 0.45 | 0.37 | 0.02 | 0.13 | 0.09 | 0.08 | 0.05 | 0.37 |
| Years Other (CIO Exp/Train) | 0.05 | 0.02 | 0.01 | 0.37 | 0.23 | 0.29 | 0.30 | 0.39 | 0.10 |
| Years CIO (CIO Exp/Train) | 0.34 | 0.47 | 0.24 | 0.30 | 0.07 | 0.47 | 0.46 | 0.49 | 0.40 |
| E-mail Receive/Send daily (CIO Comm) | 0.04 | 0.22 | 0.14 | 0.22 | 0.11 | 0.40 | 0.37 | 0.48 | 0.25 |
| PhoneCalls Make/Rec Daily (CIO Comm) | 0.41 | 0.44 | 0.16 | 0.32 | 0.27 | 0.02 | 0.03 | 0.03 | 0.02 |
| Conferences Attend (CIO Comm) | 0.02 | 0.37 | 0.26 | 0.25 | 0.21 | 0.24 | 0.25 | 0.21 | 0.35 |
| Hours work per week w/upper mgmt (Salience) | 0.36 | 0.09 | 0.47 | 0.16 | 0.26 | 0.33 | 0.30 | 0.42 | 0.21 |
| Hours day work/w command staff (Salience) | 0.19 | 0.03 | 0.47 | 0.38 | 0.04 | 0.15 | 0.10 | 0.15 | 0.43 |
| CO support (Salience) | 0.22 | 0.44 | 0.46 | 0.42 | 0.00 | 0.46 | 0.48 | 0.44 | 0.30 |
| PLO fit dept priority scheme (CIO Participation) | 0.02 | 0.01 | 0.46 | 0.17 | 0.00 | 0.44 | 0.50 | 0.36 | 0.36 |
| CIO participate in command's strategic planning | 0.05 | 0.01 | 0.39 | 0.50 | 0.37 | 0.14 | 0.11 | 0.28 | 0.20 |
| Info tech easy install/configure (Info Tech) | | 0.00 | 0.01 | 0.41 | 0.17 | 0.09 | 0.09 | 0.13 | 0.47 |
| Info tech easy Integrate w/other systems (Info T | 0.00 | | 0.11 | 0.33 | 0.18 | 0.18 | 0.17 | 0.23 | 0.35 |
| Info tech reused annually (Info Tech) | 0.01 | 0.11 | . | 0.11 | 0.28 | 0.13 | 0.17 | 0.16 | 0.08 |

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| | Info tech easy install/confi gure (Info Tech) | Info tech easy Integrate w/other systems (Info Tech) | Info tech reused annually (Info Tech) | Info tech disposed annually (Info Tech) | Purchase info tech annually (Info Tech) | Command have ADP Plan (Info Tech) | PLO Included in ADP (Info Tech) | ADP Plan Incorporate d Into Strategic Plan | Workflow mgmt used (Dep Var) |
|---|---|---|---|---|---|---|---|---|---|
| Info tech disposed annually (Info Tech) | 0.41 | 0.33 | 0.11 | . | 0.03 | 0.32 | 0.43 | 0.37 | 0.04 |
| Purchase info tech annually (Info Tech) | 0.17 | 0.18 | 0.28 | 0.03 | . | 0.27 | 0.36 | 0.32 | 0.31 |
| Command have ADP Plan (Info Tech) | 0.09 | 0.18 | 0.13 | 0.32 | 0.27 | . | 0.00 | 0.00 | 0.48 |
| PLO included in ADP (Info Tech) | 0.09 | 0.17 | 0.17 | 0.43 | 0.36 | 0.00 | . | 0.00 | 0.45 |
| ADP Plan Incorporated Into Strategic Plan | 0.13 | 0.23 | 0.16 | 0.37 | 0.32 | 0.00 | 0.00 | . | 0.39 |
| Workflow mgmt used (Dep Var) | 0.47 | 0.35 | 0.08 | 0.04 | 0.31 | 0.48 | 0.45 | 0.39 | . |
| Imagining/scanning used (Dep Var) | 0.30 | 0.34 | 0.09 | 0.36 | 0.41 | 0.45 | 0.41 | 0.44 | 0.00 |
| Internet used (Dep Var) | 0.49 | 0.17 | 0.41 | 0.26 | 0.29 | 0.35 | 0.34 | 0.43 | 0.22 |
| Intranet used (Dep Var) | 0.24 | 0.26 | 0.21 | 0.39 | 0.41 | 0.10 | 0.06 | 0.09 | 0.34 |
| To what extent are DB used (Dep Var) | 0.01 | 0.15 | 0.03 | 0.29 | 0.46 | 0.21 | 0.18 | 0.18 | 0.21 |
| EDI used (Dep Var) | 0.17 | 0.43 | 0.41 | 0.47 | 0.13 | 0.28 | 0.34 | 0.28 | 0.04 |
| E-mail (Dep Var) | 0.08 | 0.36 | 0.03 | 0.05 | 0.44 | 0.31 | 0.34 | 0.28 | 0.26 |
| Office 97 Apps used (Dep Var) | 0.01 | 0.34 | 0.12 | 0.48 | 0.05 | 0.29 | 0.30 | 0.20 | 0.43 |
| Auto Doc Track used (Dep Var) | 0.10 | 0.24 | 0.49 | 0.33 | 0.38 | 0.19 | 0.23 | 0.15 | 0.00 |
| Greatest Achievement | 0.29 | 0.09 | 0.11 | 0.26 | 0.11 | 0.50 | 0.42 | 0.50 | 0.29 |
| Correlation is significant at the 0.01 level (1-tailed). | | | | | | | | | |
| Correlation is significant at the 0.05 level (1-tailed). | | | | | | | | | |
| No Significance | | | | | | | | | |

| | Imagining/scanning used (Dep Var) | Internet used (Dep Var) | Intranet used (Dep Var) | To what extent are DB used (Dep Var) | EDI used (Dep Var) | E-mail (Dep Var) | Office 97 Apps used (Dep Var) | Auto Doc Track used (Dep Var) | Greatest Achievement |
|---|---|---|---|---|---|---|---|---|---|
| Size of MTF | 0.14 | 0.29 | 0.10 | 0.47 | 0.37 | 0.13 | 0.29 | 0.46 | 0.28 |
| MTF Clinics | 0.36 | 0.31 | 0.07 | 0.33 | 0.14 | 0.44 | 0.43 | 0.26 | 0.15 |
| Hours a day Planning (TIME) | 0.16 | 0.44 | 0.46 | 0.34 | 0.22 | 0.29 | 0.45 | 0.34 | 0.37 |
| Hours a day Implementing (TIME) | 0.12 | 0.07 | 0.18 | 0.24 | 0.29 | 0.13 | 0.31 | 0.18 | 0.26 |
| Allocated in IS Budget (MONEY) | 0.43 | 0.49 | 0.43 | 0.28 | 0.02 | 0.27 | 0.21 | 0.07 | 0.03 |
| % IS budget actually spent (MONEY) | 0.26 | 0.10 | 0.39 | 0.40 | 0.34 | 0.29 | 0.42 | 0.46 | 0.36 |
| % Spent Dept Training (MONEY) | 0.28 | 0.13 | 0.21 | 0.40 | 0.16 | 0.13 | 0.32 | 0.43 | 0.45 |
| Staff Assigned to MID (STAFF) | 0.36 | 0.41 | 0.24 | 0.33 | 0.46 | 0.34 | 0.27 | 0.46 | 0.31 |
| Perm Staff Assigned (to MID STAFF) | 0.34 | 0.37 | 0.18 | 0.48 | 0.38 | 0.31 | 0.41 | 0.44 | 0.48 |
| Add Staff Needed (in MID (STAFF) | 0.43 | 0.49 | 0.30 | 0.37 | 0.38 | 0.39 | 0.46 | 0.27 | 0.06 |
| Staff Involved in Planning (SI) | 0.35 | 0.44 | 0.06 | 0.48 | 0.49 | 0.12 | 0.34 | 0.22 | 0.16 |
| Staff Involved in Implementing (SI) | 0.34 | 0.32 | 0.14 | 0.30 | 0.36 | 0.36 | 0.40 | 0.36 | 0.10 |
| Staff Involved in Evaluating (SI) | 0.15 | 0.08 | 0.19 | 0.24 | 0.37 | 0.36 | 0.23 | 0.18 | 0.17 |
| Years Workflow Mgmt (CIO Exp/Train) | 0.46 | 0.43 | 0.14 | 0.48 | 0.16 | 0.17 | 0.26 | 0.08 | 0.16 |
| Years Scanning Equip (CIO Exp/Train) | 0.26 | 0.29 | 0.40 | 0.22 | 0.42 | 0.15 | 0.15 | 0.35 | 0.37 |
| Years Imaging (CIO Exp/Train) | 0.08 | 0.10 | 0.33 | 0.34 | 0.44 | 0.37 | 0.41 | 0.30 | 0.29 |
| Years Internet (CIO Exp/Train) | 0.30 | 0.20 | 0.29 | 0.16 | 0.23 | 0.31 | 0.24 | 0.13 | 0.28 |
| Years Intranet (CIO Exp/Train) | 0.21 | 0.36 | 0.29 | 0.45 | 0.01 | 0.12 | 0.20 | 0.01 | 0.07 |
| Years Network (CIO Exp/Train) | 0.42 | 0.38 | 0.47 | 0.21 | 0.41 | 0.04 | 0.05 | 0.25 | 0.15 |
| Years DB (CIO Exp/Train) | 0.15 | 0.29 | 0.36 | 0.47 | 0.35 | 0.06 | 0.14 | 0.40 | 0.32 |
| Years EDI (CIO Exp/Train) | 0.35 | 0.46 | 0.19 | 0.22 | 0.04 | 0.04 | 0.09 | 0.01 | 0.08 |
| Years E-mail (CIO Exp/Train) | 0.38 | 0.19 | 0.43 | 0.49 | 0.13 | 0.37 | 0.34 | 0.42 | 0.46 |
| Years Ofc97 (CIO Exp/Train) | 0.08 | 0.31 | 0.28 | 0.47 | 0.47 | 0.27 | 0.19 | 0.17 | 0.31 |
| Years ADT (CIO Exp/Train) | 0.13 | 0.41 | 0.27 | 0.22 | 0.03 | 0.49 | 0.31 | 0.20 | 0.50 |
| Years Other (CIO Exp/Train) | 0.05 | 0.32 | 0.47 | 0.17 | 0.38 | 0.44 | 0.47 | 0.18 | 0.42 |
| Years CIO (CIO Exp/Train) | 0.48 | 0.18 | 0.46 | 0.20 | 0.22 | 0.23 | 0.13 | 0.45 | 0.18 |
| E-mail Receive/Send daily (CIO Comm) | 0.47 | 0.30 | 0.03 | 0.49 | 0.06 | 0.16 | 0.23 | 0.12 | 0.38 |
| PhoneCalls Make/Rec Daily (CIO Comm) | 0.14 | 0.35 | 0.43 | 0.37 | 0.08 | 0.08 | 0.09 | 0.08 | 0.10 |
| Conferences Attend (CIO Comm) | 0.43 | 0.08 | 0.40 | 0.11 | 0.06 | 0.11 | 0.01 | 0.30 | 0.10 |
| Hours work per week w/upper mgmt (Salience) | 0.13 | 0.06 | 0.29 | 0.29 | 0.47 | 0.12 | 0.15 | 0.10 | 0.25 |
| Hours day work/w command staff (Salience) | 0.36 | 0.09 | 0.07 | 0.16 | 0.28 | 0.14 | 0.15 | 0.49 | 0.18 |
| CO support (Salience) | 0.06 | 0.09 | 0.46 | 0.19 | 0.36 | 0.01 | 0.00 | 0.49 | 0.32 |
| PLO fit dept priority scheme (CIO Participation) | 0.43 | 0.20 | 0.21 | 0.18 | 0.41 | 0.25 | 0.30 | 0.18 | 0.00 |
| CIO participate in command's strategic planning | 0.32 | 0.17 | 0.30 | 0.42 | 0.14 | 0.37 | 0.19 | 0.27 | 0.42 |
| Info tech easy install/configure (Info Tech) | 0.30 | 0.49 | 0.24 | 0.01 | 0.17 | 0.08 | 0.01 | 0.10 | 0.10 |
| Info tech easy integrate w/other systems (Info T | 0.34 | 0.17 | 0.26 | 0.15 | 0.43 | 0.36 | 0.34 | 0.24 | 0.29 |
| Info tech reused annually (Info Tech) | 0.09 | 0.41 | 0.21 | 0.03 | 0.41 | 0.03 | 0.12 | 0.49 | 0.11 |

| | Imagining/scanning used (Dep Var) | Internet used (Dep Var) | Intranet used (Dep Var) | To what extent are DB used (Dep Var) | EDI used (Dep Var) | E-mail (Dep Var) | Office 97 Apps used (Dep Var) | Auto Doc Track used (Dep Var) | Greatest Achievement |
|---|---|---|---|---|---|---|---|---|---|
| Info tech disposed annually (Info Tech) | 0.36 | 0.26 | 0.39 | 0.29 | 0.47 | 0.05 | 0.48 | 0.33 | 0.26 |
| Purchase info tech annually (Info Tech) | 0.41 | 0.29 | 0.41 | 0.46 | 0.13 | 0.44 | 0.05 | 0.38 | 0.11 |
| Command have ADP Plan (Info Tech) | 0.45 | 0.35 | 0.10 | 0.21 | 0.28 | 0.31 | 0.29 | 0.19 | 0.50 |
| PLO included in ADP (Info Tech) | 0.41 | 0.34 | 0.06 | 0.18 | 0.34 | 0.34 | 0.30 | 0.23 | 0.42 |
| ADP Plan Incorporated Into Strategic Plan | 0.44 | 0.43 | 0.09 | 0.18 | 0.28 | 0.28 | 0.20 | 0.15 | 0.50 |
| Workflow mgmt used (Dep Var) | 0.00 | 0.22 | 0.34 | 0.21 | 0.04 | 0.26 | 0.43 | 0.00 | 0.29 |
| Imagining/scanning used (Dep Var) | . | 0.10 | 0.37 | 0.22 | 0.03 | 0.28 | 0.17 | 0.08 | 0.26 |
| Internet used (Dep Var) | 0.10 | . | 0.04 | 0.02 | 0.23 | 0.00 | 0.00 | 0.33 | 0.09 |
| Intranet used (Dep Var) | 0.37 | 0.04 | . | 0.00 | 0.16 | 0.22 | 0.14 | 0.36 | 0.35 |
| To what extent are DB used (Dep Var) | 0.22 | 0.02 | 0.00 | . | 0.27 | 0.01 | 0.00 | 0.35 | 0.16 |
| EDI used (Dep Var) | 0.03 | 0.23 | 0.16 | 0.27 | . | 0.28 | 0.23 | 0.00 | 0.12 |
| E-mail (Dep Var) | 0.28 | 0.00 | 0.22 | 0.01 | 0.28 | . | 0.00 | 0.43 | 0.14 |
| Office 97 Apps used (Dep Var) | 0.17 | 0.00 | 0.14 | 0.00 | 0.23 | 0.00 | . | 0.13 | 0.41 |
| Auto Doc Track used (Dep Var) | 0.08 | 0.33 | 0.36 | 0.35 | 0.00 | 0.43 | 0.13 | . | 0.40 |
| Greatest Achievement | 0.26 | 0.09 | 0.35 | 0.16 | 0.12 | 0.14 | 0.41 | 0.40 | . |
| Correlation is significant at the 0.01 level (1-tailed). | | | | | | | | | |
| Correlation is significant at the 0.05 level (1-tailed). | | | | | | | | | |
| No Significance | | | | | | | | | |

# APPENDIX D.  CORRELATION FOR DEPENDENT MEASURES AND VARIABLES

Pearson Correlation
Sig. (1-tailed)

| | DepMeasure | Size | Resource | Planning | Time | Money | Exp/Train | Participation | Staff | Staff Involvement | Salience | Reuse | User Friendly |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DepMeasure | . | 0.41 | 0.26 | 0.18 | 0.48 | 0.17 | 0.35 | 0.33 | 0.42 | 0.18 | 0.06 | 0.36 | 0.03 |
| Size | 0.41 | . | 0.26 | 0.06 | 0.26 | 0.22 | 0.46 | 0.40 | 0.00 | 0.18 | 0.22 | 0.10 | 0.25 |
| Resource | 0.26 | 0.26 | . | 0.39 | 0.00 | 0.10 | 0.21 | 0.20 | 0.26 | 0.01 | 0.15 | 0.43 | 0.34 |
| Planning | 0.18 | 0.06 | 0.39 | . | 0.33 | 0.09 | 0.30 | 0.13 | 0.06 | 0.10 | 0.49 | 0.24 | 0.12 |
| Time | 0.48 | 0.26 | 0.00 | 0.33 | . | 0.06 | 0.24 | 0.07 | 0.26 | 0.02 | 0.18 | 0.39 | 0.39 |
| Money | 0.17 | 0.22 | 0.10 | 0.09 | 0.06 | . | 0.33 | 0.16 | 0.22 | 0.41 | 0.41 | 0.09 | 0.03 |
| Exp/Train | 0.35 | 0.46 | 0.21 | 0.30 | 0.24 | 0.33 | . | 0.29 | 0.47 | 0.23 | 0.18 | 0.38 | 0.23 |
| Participation | 0.33 | 0.40 | 0.20 | 0.13 | 0.07 | 0.16 | 0.29 | . | 0.41 | 0.32 | 0.10 | 0.39 | 0.05 |
| Staff | 0.42 | 0.00 | 0.26 | 0.06 | 0.26 | 0.22 | 0.47 | 0.41 | . | 0.18 | 0.21 | 0.10 | 0.24 |
| Staff Involvement | 0.18 | 0.18 | 0.01 | 0.10 | 0.02 | 0.41 | 0.23 | 0.32 | 0.18 | . | 0.08 | 0.28 | 0.35 |
| Salience | 0.06 | 0.22 | 0.15 | 0.49 | 0.18 | 0.41 | 0.18 | 0.10 | 0.21 | 0.08 | . | 0.46 | 0.22 |
| Reuse | 0.36 | 0.10 | 0.43 | 0.24 | 0.39 | 0.09 | 0.38 | 0.39 | 0.10 | 0.28 | 0.46 | . | 0.01 |
| User Friendly | 0.03 | 0.25 | 0.34 | 0.12 | 0.39 | 0.03 | 0.23 | 0.05 | 0.24 | 0.35 | 0.22 | 0.01 | . |

*  Correlation is significant at the 0.05 level (1-tailed).

**  Correlation is significant at the 0.01 level (1-tailed).

No Significance

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